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SCHOOL, BUNGALOW, AND REST-HOUSE GARDENS, AND SOME HINTS ON HOW TO PLANT THEM.

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THE general scheme for the working of school gardens, as has been set forth elsewhere, is to have small gardens at the schools, worked by the personal labour of the masters, and scholars, who may divide two-thirds of the produce between them, and to give the scholars simple lessons in "Nature Study," using as objects of study the simpler operations of the garden, and the innumerable natural objects and phenomena around them. In providing these gardens with plants, the object to be kept in view is to provide only the best varieties of each kind, so far as possible. There is no great variety of plants in most of our villages; what is cultivated in the school gardens will gradually diffuse into the neighbourhood; hence it should be the best possible of its kind. In the second place, the village teacher is not qualified to teach agriculture, nor to criticise intelligently the agricultural operations of the district: he must carefully avoid trying to grow the staple crops of the neighbourhood, lest he fail—as he probably will—to do as well as the villagers and thus bring himself into ridicule. Hence the school garden must cultivate in general things not common in the district.

Every child in the school should help in the garden, and if possible grow a few plants him or herself. We want all the children to learn something about plants, to grow them as well as they can, and to come to love them. The school garden and perhaps more especially that part that is worked by the joint labour of masters and scholars, will of course contain many useful plants, but we do not want the children to look upon all cultivation for the sake simply of the rupees it may bring in and ornamental plants should be grown also. There are other interests in life than mere money-making. The child who grows up to love nature, and the beauty of natural objects and phenomena, and to observe what goes on around him, will live a happier life than the one who gives himself up from the first to the consideration of monetary gain; in the long run, too, he will probably be the richer in actual money, and he will be less liable to spend his earnings on coarse and expensive pleasures.

Let, then, the school garden, in addition to the useful plants in the narrower sense, cultivate as many as possible of the ornamental. Let it be laid out as beautifully as possible with the means at disposal. Let masters and scholars take a pride in the prettiness of their garden. An attractive school garden will be a great benefit to the neighbourhood in many ways; it will make school more attractive to the scholars, will promote in them good taste and a love of natural beauty, and will stimulate the neighbours to do likewise.

The remarks made below apply equally to rest-house or private bungalow gardens. Parents should encourage their children to work in the garden and take an intelligent interest in it and in the plants growing in it.

The first point to be borne in mind is that the beauty of a garden depends, not on the particular plants it may contain, but mainly on the skill with which it is laid out, its natural advantages further improved and emphasised, and its defects lessened or concealed. The world-famous beauty of the

Peradeniya Gardens depends partly on the natural advantage of the site, with its broad river and mountain background, but quite as much on the great skill and taste with which it was laid out and planted by Dr. Gardner and others. The plants with which the beautiful scenic and gardening effects are produced are nearly all the same as the common ones that one may see in almost every large garden in the Island, but by skill in grouping and laying out so fine an effect is produced that it is often difficult to get people to believe this.

In an ordinary native garden the planting is not ornamental, because the object is to obtain as much monetary return from the land as is possible, and the ground is thickly planted up with useful trees and plants with no attempt at artistic grouping. The bulk of the trees are usually coconuts. Individually or in clumps these are very beautiful trees, but their effect in great plantations is wearisome, depressing, and inartistic. We do not want our school gardens to be mere monotonous coconut groves: we want some variety, some taste in laying out, some pretty flowers, something which will make the garden pleasant to look at. If, as, in some cases, the land is already a dense coconut grove, then, unless some of the trees can be cut down, not much can be done, for few things will grow in the shade of coconut palms.

Let us now consider some general principles of laying out, which are applicable equally to any garden on a small scale, such as a resthouse or bungalow garden. The first great thing to remember in ornamental planting is the provision of open spaces: not merely are these pleasant in themselves, and useful as lungs and playgrounds, but the trees and shrubs, as well as the flowers, have room to be seen to advantage, and make much better growth, forming leafy masses, instead of growing up tall and spindly with all their leaves at the top. Put the larger trees and shrubs near to the sides of the ground. Especially put them on the sides that will protect the central parts from the wind in the monsoons, *i.e.*, in most localities put them on the south-west and the north-east. But do not have too many trees—give them room to grow and spread out so to show themselves to the best advantage.

Plant the trees and shrubs in clumps or singly, as the case demands, not in rows or belts. Contrast the ugliness of the wind belts in the tea estates with the beauty of the irregular patches of natural jungle. The latter are also made up of different kinds of trees, and this is an important feature in their beauty. In mixing trees, however, do not mix those which differ too radically in form and habit; do not mix many palms among ordinary leafy trees of conical or spherical form; palms lend themselves very well indeed to massing in groups of palms and cycads, with the larger in the middle or at the back and the smaller near the edge or the front, as in the beautiful groups at Peradeniya. Remember, too, in mixing trees, the colour of their flowers, and do not put trees whose flowers are of inharmonious colours together. For instance, do not put a pink-flowered Cassia beside a red Flamboyant or grow a purple Bougainvillæa or an Amherstia. If the trees do not flower at the same time of year, this is of less importance.

Before you begin to plant, look at your ground from all sides and think how to use it to the best advantage. Draw a rough plan of it on the blackboard, and mark out on this as you think best the way in which you mean to plant your ground. Make the most of its natural advantages. If there is an unpleasing view or building in any direction, plant so as to conceal or diminish its ugliness, but if there is a pretty view do not hide it, but give it a good foreground, *i.e.*, one clear of trees and shrubs or flower beds in the centre, so as not to interfere with the view, but prettily framed with trees or shrubs at the sides; bamboos make especially pretty frames to a good view, but there are many ways in which the object can be attained. If there are any steep banks in the ground do not, if you can help it, plant them with trees; they lend themselves well to small plants, especially if rocky. Bring up all the stones that interfere with the work in other parts of the garden, and put them in natural positions on the bank, and plant the bank with ferns, mosses and flowers. When it is planted put the smaller stones close together in the surface earth between the plants, and this will keep the earth from being washed away by the heavy rain. Go out into the country round and see how beautiful nature makes these steep banks at the sides of the roads and elsewhere with ferns, mosses, and other little plants, provided it be shady enough. Try to imitate nature; bring in pretty plants from the banks of the roads and put them in places as like those they came from as you can. The success of a gardener depends on his being able to give to his plants the nearest possible imitation of the conditions under which they do well in nature. Let each child have a little piece of the garden if there is room for it, and let him try to imitate nature, bringing in wild plants and trying to grow them successfully. If the bank in the garden is not shady enough, plant some trees near it, but not upon it. If it is too high for convenient working, make a terrace on it. Otherwise make pockets in it and put the plants in these.

We must also, if possible, find room for some shrubs as well as trees. A close shrubbery makes an excellent screen for outhouses or for ugly surroundings outside the school grounds, and serves as a good background for flower beds. Shrubs and trees may be mixed together; some shrubs will do well in the shade of trees and may be put right among them, others must be put at the edges of the groups of trees. Do not, however, plant shrubs among or around all the tree clumps. Leave most of these as they are. Large flowering or foliage plants may often be mixed among shrubberies with great advantage: caladiums, alocasias, cannas, &c., are especially suitable under this head.

Ceylon gardens are famous for their pretty flowering creepers, and we must not forget these very effective plants, if we have an old tree, or a trellis, or a side wall to plant them on; but do not have many in a school garden, and do not cover the building with large loose-growing creepers. Ficus repens, which clings closer than ivy, is very suitable for the walls of the building. Remember the colours of the flowers of the creepers you plant, and do not have a Bougainvillæa, as it is too overpowering for a small garden, and to make it effective from an artistic point of view everything else must be subordinated to it, even the dresses of the people frequenting the garden.

The garden must have some flower beds. Flower beds should not be put without a background in the middle of the lawn or open space—flowers want a dark background to show up their bright colours, so we must put them against a mass of trees or shrubs or against a wall with creepers on it, or near the house, or against the dark shadow of a mass of trees at a little distance. If you put them near the school house wall, be careful that the drip from the eaves is taken away by guttering; otherwise, they will not thrive.

In laying out flower beds, do not put the plants in stiff rows but in groups and clumps, and fill up the ground as much as possible; nature does not leave patches of bare earth between her plants, and if such are left the best part of the soil is washed away and the plants are injured by mud splashed upon them. Let the plants grow as they will till they fill up the spaces, and keep away weeds, and trim the plants carefully to keep them in their places when they have filled those places. Use as many different kinds of flowers as you can, and bring

in pretty wild flowers from similar situations as regards light and soil and plant these. Remember not to mix inharmonious colours. Put the small plants at the front and the larger at the back.

Do not make the beds more than three feet wide, so that the children can easily get at all the plants in them. When first making them dig out the soil to a good depth and remove all the roots of trees from it: break up the soil finely with the mamoty and the fork if you have such a tool, and mix with it a supply of well-rotted manure if you have any. If you have not, make a pit in some out-of-the-way corner of the garden and begin a leaf mould store putting into it all the dead leaves and other garden rubbish and keeping it covered from the rain as well as possible. Put your flower beds in well-drained places, not in the lowest parts of the garden. The digging up and manuring should be a yearly operation and in some cases even more frequent.

We must not forget the walks in laying out our garden. Do not, as a rule, make straight ones, unless the distance is short or between points where short cuts are possible. If the walks are in the open spaces of the garden let them be walks only, do not plant flower beds beside them.

Do not leave the schoolhouse or bungalow a bare exposed building in the middle of an open space; group your trees so as to make a picture in which the schoolhouse shall be the prominent feature as seen from the principal road. For instance, put a clump of trees near to the house on one side and tapering away into the open area, but do not let th line of the trees be at right angles to that of the building. Put some flower beds near the building inesuitable positions. Avoid exact regularity in the arrangement of the garden on the two sides of the building, from whatever direction it may be seen.

Now, let us turn to the consideration of the economic or more strictly useful plants of the garden. Many of these will be trees or shrubs, *e.g.*, cloves, nutmegs, sago, oranges, cacao, limes, mangoes, coffee These may be planted, with strict regard to the principles of ornamental gardening laid down above in the places best suited to them. Cacao must be in the shade of other trees, also coffee, but not very dense shade is required. Sago palms must be put in damp or even swampy places. The other trees will do very well almost anywhere and may be planted in clumps, but oranges and limes, which are small trees, must not be put in the centre of the clumps.

Such economics as are climbing plants may be put among the trees or shrubs on suitable supports if they require shade, or out in the edges of the clumps if they require sunshine, as the case may be. Pepper and vanilla need a good shade, but many yams, &c., prefer some sunshine. Other economics, such as yams of some varieties, pineapples, ginger, maize, guinea corn, cassava, arrowroot, sweet potatoes, and other vegetables, are herbaceous or only small shrubby plants, and are best cultivated in special beds laid out in rows. These beds should be in good sheltered parts of the garden, but need not be obtrusive. They must of course be prepared and cultivated with special care.

Lastly, we must have a nursery in which we may start our trees and shrubs, and even some of the smaller plants. This also must be in a good soil, well-drained, in a sheltered but not too shady part of the garden, and must be the object of special care and attention.

Now, in conclusion, let us sum up the main points to be attended to. First attend to the broad general features of the garden, then to the details. Go over all the ground, dig holes here and there if necessary to see what kind and depth of soil you have in different parts, and make a rough plan showing the house and boundaries, and any other unalterable features of the land, such as neighbouring houses visible from the ground, pretty views &c. Decide the position of your clumps of trees, with reference to the making of screens from wind, hiding ugly views or buildings, emphasizing pretty ones, making a good setting for the schoolhouse, &c. Then settle the position of the shrubberies, vegetable garden, nursery, and flower beds, and see that the most is made of steep banks or of other good natural features, such as rivers, streams, or ponds. Then, as your plants come on in the nursery, plant them out according to your pre-arranged plans, of which you should keep a copy, but do not try to arrange everything in an hour or two. Go into the garden again and again on different days and think everything over carefully, and look at everything from all sides and decide what will be best.

Attention must always be paid to the special local or other conditions of the particular garden. For example, in the case of railway gardens, or of bungalows which have merely a narrow strip of garden along the front or side, the provision of open spaces is impracticable in the sense described above. With a railway garden, the object to be aimed at is to provide for travellers by the passing trains and for people walking along the platform, a succession of small pictures of the greatest possible beauty. A long platform garden is perhaps best treated by being laid out in irregular smaller plots open to the platform, and with a few trees and shrubs at the back and sides of these and flower beds and creepers in suitable places. In the case of a bungalow with only a strip in front, it must be decided whether privacy shall be aimed at, or a pretty appearence as seen from the road. In the one case shrubs and trees must be planted along the road, and the space between them and the house laid out to make the best possible effect as seen from the latter. In the other case the house hould be used as the centre of a picture as seen from the road, and shrubs and trees planted near it as required, the clumps tapering away down the sides of the plot towards the road.

JOHN C. WILLIS,
Director, Royal Botanic Gardens.
Peradeniya, June 25, 1901.

BASIC SUPERPHOSPHATE: ITS PREPARATION AND USE AS A MANURE.

BY JOHN HUGHES, F.I.C.,

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(*Continued from page 73.*)

Discussion.

Dr. J. A. Voelcker said that not many weeks ago a lecture had been read to chemical manufacturers, and more especially to manufacturers of superphosphates, to the effect that they must "put their house in order." Now they had another warning—they must no longer use dissolved phosphates; that seemed to him a retrograde step, for, when one considered the great benefits to agriculturists which had come from the introduction of dissolved phosphates, one could not but wonder at the proposal to dissolve phosphate first and then precipitate it again; in other words, to go to the trouble of undoing the work already done. Mr. Hughes had refe.red to the labours of his (the speaker's) father on the subject: but it was necessary to consider the present question in its different aspects, and to remember also the attitude taken up by the late Dr. Voelcker with regard to the comparative values of dissolved and undissolved phosphates. Mr. Hughes had referred to one point which the late Dr. Voelker had always insisted upon, *viz*, the very fine state of division of the phosphate when superphosphate was washed into the soil by rain; but Dr. Voelcker was always decidedly opposed to the views

held by Mr. Jamieson, of Aberdeen, as regards the harm done to the soil by the use of superphosphate. On his farm at Woburn he (the speaker) had a plot of land which had heen manured yearly with superphosphate for the last 24 years to his own knowledge. The soil had, at the commencement, a very small amount of lime, 0·25 per cent. of carbonate of lime only, hut the plot had not yet suffered from deficiency of lime. There were other plots in the same field which had, indeed, so suffered, the lime having heen removed to a very great extent by the continued use of soluble nitrogenous manures. He could not, therefore, altogether agree with Mr. Hughes as to the great necessity for a manure which had the acid character taken away hy admixture with such a suhstance as finely ground limc. He had certainly come across soils which were so poor in lime as to require nothing so much as a good dressing of lime; he had not yet had experience with the new material which Mr. Hughes had just introduced, and so did not know whether that purpose might he well served by it; but, if so, he ventured to suggest that it could be done without the necessity of buying a patent manufactured manure. He was not going to discuss the question of citric acid, and how far it was a test of the availahility of phosphatic materials; but, as they had just heard the use of hot water mentioned for determining the amount of phospate available, and had been reminded that it did not occur in the soil, he might equally well point out that they did not have citric acid in the soil either. With regard to basic slag he did not think they had yet arrived at a solution of the cause of its utility. Attempts had heen made to estimate this hy the solubility in citric acid solution; hut there were many other things in the soil which might exercise an influence on the solubility of the materials applied to it. He would like to have seen some comparison given between basic slag and hasic superphosphate with regard to their respective solubilities in citric acid solutions of different strength. What was the behaviour of each in a solution of the strength likely to be met with in soils? It might he taken for granted that there were soils which were sorely in need of lime, and where superphospha'e might do harm; but he would ask Mr. Hughes where was the advantage of using superphosphate mixed with lime as compared with the use of a material like precipitated phosphate, which was just as soluble in citric acid as was Mr. Hughes' mixture. And then, even if it were granted that the mixture had advantages, what was there to prevent the farmer from buying the lime and the superphosphate separately and mixing them together himself? If Mr. Hughes said that a farmer could not do this, but would be hound to buy a patent manure, ready mixed, he (the speaker) had still to learu that such a patent was of auy valuc when it was taken out. If the farmer thought it a good thing to neutralise superphosphate hy lime he would mix the two materials together, patent or no patent. There was, to his mind, a further disadvantage, inasmuch as Mr. Hughes did not sufficiently imitate the action of the soil in the mixing together of the two materials. If superphosphate was taken and ground lime added to it, the lime did not work through the whole mass, hut there was only a superficial action, the exterual portion heing neutralised and the inner left as it was. So one did not get a through neutralisation and distrihution of precipitated phosphate purely hy a mechanical mixing of the ground lime and superphosphate. The only advantage apparent to him was that there might bo some places abroad or in the colonies where lime was not obtainable, or where it was so expensive that its use in any quantity was practically out of the question. If soils in such placcs were very deficient in lime one might certainly get some advantage by using lime and superphosphate together, hut, for that matter, he did not see the advantage which the new material had over precipitated phosphate in this respect, nor why one shonld not get the materials separately and mix them for himself.

Mr. F. J. LLOYD said that it was now about a quarter of a century since any new manure was brought before the agricultural world and that was a sufficient reason for thanking Mr. Hughes for having hrought before them a new mauure. Whether it would prove of value or not, time only could show. The author had given two reasons why it might prove valuable: first, because from the empirical tests made there was every reason to suppose that the phosphate of lime would be quite as available to the plant as the phosphate in superphosphate, and more available than that in basic slag, which for the last twenty years had proved a valuable and effective manure; and, secondly, because it was not acid, and therefore suitable for soils of an acid character or deficient in lime. There was another reason, in his own opinion, why Mr. Hughes's mixture should be a valuable manure. The progress of science in agriculture had of late years heen mainly bacteriolcgical. As lecturer on agriculture at King's College, it was his duty to explain why we manure the land. Formerly there were only two reasons: one, to supply a deficiency of any material in the soil; and the other to supply material of a nutritive character to the particular crop to he grown. But science had recently shown a third reason of considerahle importance, and one which threw light on the action of manures hitherto difficult to explain. The soil was full of hacteria, and many of the plants grown in the soil were affected by hacteria. These bacteria must be fed in order to carry on the functions of their life. Taking the bacteria most studied, those which produced nitrification in the soil, it had been proved that they were most active in a material of an alkaline nature, and did not act and grow, except slowly, in any material of an acid nature; therefore, if one added something to the soil which, while it supplied the plant with one variety of food, also supplied conditions which enahle the hacteria to supply another form of food, and helped the nitrifying organisms to carry on their work, that manure served a double purpose. Basic slag had had that effect, because of the double action hrought into play—the supply of nitrogenous matter to the plant as well as phosphatic food. Arguing *a priori*, there was every reason to suppose that this basic superphosphate would have the same effect, and he really helieved that they had to thank Mr. Hughes for the introdution of a material of considerable value. It was all very well to say that, if the soil contained lime and acid, superphosphate did no injury; hut they had to deal with the British farmer, and he was a peculiar man. For the last twenty years liming had gone out of fashion, and the soil was deprived of lime as much hy the use of nitrogenous manures as by superphosphate. Consequently, the soils of the country were becoming more and more deficient in lime, and an acid superphosphate, was not, in his opinion, likely to have the same effect as a basic superphosphate, which gave the farmer the lime and availahle phosphates at the same time. He would not enter into the question of the estimation of the value of this material; but he did hope, as an official agricultural analyst having to carry out the Fertilisers Act, that those who put the manure on the market would give a distinct guarantee as to what it should contain. He was sure they would find it heneficial to themselves, and it would be a subject for future discussion to determine whether that guarantee was a satisfactory one or not. He felt personally grateful to Mr. Hughes for hringing this valuable communication forward.

Mr. J. RUFFLE agreed with the last speaker. He was not surprised that Dr. Voelcker should throw cold water on this new idea, for it was just what happened on the introduction of basic slag 20 year

ago. One after another the authorities refuse to have anything to do with it, and he got a wigging because he suggested that it would have a manurial value. The fact was that basic slag had become a very useful maunre both in England and on the continent. Dr. Voelcker asked, Why should not a farmer take his superphosphate and add lime to himself? He might, but he would not do it so well as a manufacturer. But would one gain anything by taking superphosphate and adding lime to it? He ventured to think one would, wherever an alkaline phosphate would be useful; also because the ordinary acid superphosphate was, after all, not on the average in a very fine condition; it would hardly go through a 10-hole sieve. But after mixing it with lime, one could send the mixture through a 30- or 40- hole sieve. Taking the relative surfaces which the increased fineness yielded, one would find very great advantage by that superior subdivision, so that in many cases it would be found quite equal to the ordinary acid superphosphate, even where this article was successfully used. One advantage it had was that it was more readily distributed, and that it would allow of the simultaneous use of nitrate of soda, and where it was desirable to put them together that could be done. One point had not been touched upon which he thought the makers of this article would find desirable, namely, the degree of hydration of the lime to be added to the superphosphate. If they took quicklime and added it after grinding, they would get tricalcic phosphate, but if they hydrated it with as much water as it would carry, they would get a finely divided powder; this, added as Mr. Hughes directed, was one that produced a hydrated mono- or dicalcic phosphate which was far more soluble. Therefore he suggested that they should take a lime that would take two-thirds of its weight of water, and hydrate it at that rate; this would break down readily. If they took lime and water in those proportions, namely, one of lime (CaO) to two of water (H_2O), when added to the superphosphate it would form a body which would be more soluble than with a greater number of molecules of lime (CaO) only. He believed it would prove to be more valuable as a manure than even basic slag had been.

Dr. BERNARD DYER said that it was interesting to think that the author of the paper before them, Dr. Voelker, Mr Lloyd, Mr. Ruffle, and himself were all old pupils of the same grand old master, and he could not help thinking that most of what was best in the knowledge af all of them had been derived from him. For really the quotations that Mr. Hughes had made from the early paper by Dr. Voelcker went to the heart of this matter. The great value of a superphosphate lay in its diffusibility, and the utmost value to be derived from this quality could only be realised in those soils which had a satisfactory proportion of carbonate of lime. He had tried to persuade farmers to use more discrimination as to the kind of phosphatic manure they employed, and had laid it down as a rule for guidance that, if they had a soil that would effervesce when hydrochloric acid was poured on it, an acid or dissolved phosphatic manure was the most valuable one they could use; but that, when no such effervescence took place, they should have resource to some other form, such as bonemeal, guano, or basic slag. There was another material which was manufactured to a large extent some years ago, and was referred to by Dr. Voelcker, mamely, precipitated phosphate. Large quantities of it were made on the Rhine by precipitating a solution of phosphoric acid with lime, and it was suitable for use on soils which were deficient in lime. What Mr. Hughes made was precipitated phosphate. He felt inolined to quarrel with his term "basic." He really made a precipitated phosphate, and he probably made it more cheaply by this "dry" process than it could be made by the "wet" method of precipitation. But the manufacture of precipitated phosphate by the "wet" process had almost entirely disappeared since the efficacy of basic slag had been recognised, and basio slag had quite taken its place. That fact was presumably due to questions of cost. The question now was whether it was more eco omical to dissolve phosphate by the process of Mr. Hughes, and then use lime te neutralise it. He took it that the unit price of the phosphoric acid in this material would be higher than in some other forms of manure; and they had yet to learn whether it was so much more useful as to warant that higher price. Following the teaching of Dr. Voelcker, he had recomended farmers having soils poor in lime to buy superphosphate and bone-meal, and make a compost of it and also neutralise it. It occurred to him that it might possibly be more economical to use finely ground phosphate itself instead of lime. One would thus be retaining in an available form all the phosphate already dissolved, and the free phosphoric acid which existed in the phosphate would react on the fresh quantity and make some of that available, as well as being itself converted into the non-acid form. What Mr. Llyod had said with regard to farmers being reluctant to use lime was quite true. He did not think, however, it was due to obstinacy, but rather to poverty; for to lime soil in some districts was very expensive, and in the present time the farmer had to look at every source of expense. He had no doubt that Mr. Hughes' mixture would be a very useful and valuable manure; his only doubt was as to its economy. He had shown it to be more soluble than slag phosphate in such weak solutions of citric acid as he had taken; but he feared that, if he took acids of such strength as were used on the continent, those great differences would disappear. As to the doubt which Dr. Voelcker had thrown on the validity of Mr. Hughes' patent, he would not like to express an opinion. Patent law was very complicated, and there was no knowing what the result of litigation on such a subject might be. He should think the case would go right up to the House of Lords and that a great many experts would be found on each side of the question.

Mr. A. G. BLOXAM presumed that the 27 7 soluble in Mr. Hughes' table represented that percentage of tricalcium phosphate rendered soluble. Mr. Hughes treaed the same sample of superphosphate with lime, and found 94 per cent. soluble in citric acid. Did he mean to say that the calcium sulphate and all dissolved up? If so, the comparison appeared to the speaker to be valueless. Then, with regard to that same determination, the sample mixed with lime was washed with water and citrio acid, the soluble mattter weighed, and the residue ignited and weighed; the whole theu added up to 100. Was that so?

Mr. HUGHES replied that it was so.

Mr. D. A. LOUIS said it might interest the meeting to hear the views of one who had not had the advantage of being in the late Dr. Voelcker's laboratory. Some years ago, however, he had been in the laboratory at Rothamsted and he remembered the position taken up by Dr. Augustus Voelcker, Sir John Lowes, and Sir Henry Gilbert in connection with basic slag. They all persistently set their faces against it, considered it absolutely valueless, and even refused for some time to experiment with it. It was thought to contain deleterious ingredients, and the phosphoric acid to be in an unsuitable condition, and that it could be valuable as a plant food seemed to them an impossibility. He remembered discussing the subject with Dr. John Voelcker some years ago, who, too, considered it quite worthless. In course of time, however, all these gentlemen came to recognise basic slag as an important manurial agent. That fact showed the position that some of our dear old agriculturial friends were liable to take up when anything novel was presented to them, although

one would think it would be wiser to suspend judgment until experimental evidence was forthcoming. By Mr. Hughes' suggestion it seemed that a factor which rendered superphosphates unsuitable for certain soils was removed in a very simple manner, and at the same time yielded a mixture in a convenient from for use on the farm, which, moreover, on the face of it, might prove of high manurial value; but, of course, this point could only be decided by trustworthy experiments, to which the speaker, amongst others, would look forward with interest. As chemists, of course, they must all admit that in these mixtures they had sulphuric acid, phosphoric acid and lime, and these bodies had always been the constituents of such artificial manures from the beginning. When Mr. Hughes told him of his invention, it struck him that the proposal was somewhat retrogressive, and he suggested that to him; and further, that on putting lime into the manure the phosphoric acid would possibly assume a reverted condition, that was, go back to tribsaic phosphate. However, in practice things did not always happen as we expected them to happen, and so perhaps in this case the expected might not happen. He would like to ask Mr. Hughes how long the mixture given on the table had been prepared, so as to yield 66·8 of soluble matter, inasmuch as if it consisted of phosphate, it would at once put out of court Dr. Dyer's argument, as there was no dibasic phosphate that would give that solubility in water.

Mr. HUGHES: Table III. represents the portion soluble in water. The whole of the phosphates were rendered insoluble in water, and therefore it did not appear on the table.

Mr. LOUIS, continuing, said, if that were the case, Dr. Dyer's contention might be right Then there was the other point mentioned by Mr. Lloyd, and admitted by all who knew, that without any doubt it was valuable to add lime in some soils; and, as Dr. Voelcker held, the farmer might be free to buy the lime and phosphate separately and mix them himself; but the farmer would not do that; he liked things made easy for him, and liked to buy his materials ready for use as "wheat manure," "barley manure," and so forth. The farmer, for want of means, would not put lime on his soil, but he knew that he must put some phosphate; and if he could conveniently buy the lime at a moderate price along with the phosphate, he would very likely do so, especially if he got it in a form convenient for handling, and could by one sowing and one expenditure introduce two valuable factors into his soil. He was sorry to learn from the author that the 66·8 was not the material one would have liked to see soluble and suitable for plant food, though it might prove suitable for Mr. Lloyd's bacteria, a d probably do good in that way.

Note.—At the time of speaking Mr. Louis was not aware of the fact that excess of lime was employed in Mr. Hughes' mixture.

The CHAIRMAN had no wish to stand as umpire between two contending parties. No doubt each of these materials had its value in the right place, and each of them was useless in the wrong place. If Mr. Hughes's mixture could be made at such a price as to be as cheap as other phosphates, he thought it had a considerable future before it. But when he considered that first in the making of the superphosphate the original raw phosphate got diluted by sulphurio acid, and then still further diluted by the addition of lime, the net result was a mixture containing only a fraction of the tribasic calcium phosphate present in the raw material; and it was difficult to see how such a mixture could compete with a material like Thomas slag, which had not to undergo those processes of dilution. Assuming that the material of Mr. Hughes was more soluble and more available than soluble Thomas meal, the question was, how could such a material, which had to stand the cost of grinding, treatment with sulphuric acid, lime, and carriage on a reduced percentage of phosphoric acid, hope to compete with basic slag? If, however, Mr. Hughes could give satisfactory assurances on that point he had rendered a service to agriculture.

Mr. RUFFLE said that Dr. Voelcker had referred to the precipated phosphate made on the Rhine, and had questioned whether Mr. Hughes' material would be able to compete with it. Was that precipated phosphate hydrated? He believed it was a very rich tricalcic phosphate, but not hydrated. Mr. Hughes' proposal really was to take the hydrated P_2O_5 in the superphosphate; to that he added hydrated lime, and thus got a hydrated compound of phosphoric acid and lime. Would not that hydration give it such a start of superiority that it would answer where the precipated phosphate would not?

The CHAIRMAN: Does Mr. Ruffle assume that a different compound would be obtained by adding calcium hydroxide instead of calcium oxide? Is there any chemical evidence to that effect? No matter what form the lime may be in, the same product would probably result.

Mr. RUFFLE said he thought one would get Mr. Hughes's compound by putting 15 to 20 per cent. of hydrated lime. One would want more than that to form a tricalcic phosphate; but by adding 17 per cent. one got a phosphate which had some water and some lime. In fact, Hughes produces an alkaline hydrated dicalcium phosphate in the superphosphate (P_2O_5. CaO, CaO, H_2O, *plus* a slight excess of $CaO2H_2O$ for alkalinity.

Mr. STEWART remarked that if one added calcium oxide there was a danger of forming pyrophosphate of lime. Did Mr. Hughes confine himself to producing dibasic phosphate? Was there just sufficient lime to form two of CaO to one of PO_5?

Mr. HUGHES, in reply, said he was pleased to find that he had very little to answer. Dr. Voelcker had suggested that farmers would add lime to superphosphate themselves. They were quite welcome to do so, for it would increase the sale of superphosphate; but they would find a difficulty in preparing a perfectly uniform mixture. Further, it was a fact that in those parts of the country where lime did not occur in sufficient quantity in the soil, the farmer would have to purchase it from a distance and at considerable cost; therefore the application of lime where it was most required was generally neglected. Moreover, instead of purchasing superphosphate and lime separately, the farmer could purchase basic super, and so supply both available phosphates and lime at one dressing. With regard to precipitated phosphate, which had been referred to, it was well known that it was an expensive material, prepared by a wet process, whereas basic super was a comparatively cheap material prepared as a *dry* mixing, so that any manufacturer could make it; consequently there was no fear of competition with precipated phosphate. Bearing in mind the opposition that basic slag had originally met with at the hands of scietific men, and knowing the immense quantities of it that were now used, he took encouragement that, even if his material met with similar opposition now, he felt confident that the practical results in the field would be satisfactory.

Dr. VOELCKER, interposing, said he thought it ought in justice to be pointed out that basic slag as it was known now was a very different body from the slag that was first introduced, and the results now obtained could not have been obtained by the material then condemned and rightly condemned.

Mr. HUGHES, resuming, said that the only improvement that had taken place in the quality of slag was due to improved grinding; and he would like to refer to Table I., in which the Peace River phosphate, with a grinding of 93·61 fineness, actually showed a greater amount of phosphate of lime dissolved by the weak solution of citric acid than was shown by the basio slag, the figures being 21·61 as against 18·99. He ventured to think that

had the Aberdeenshire experiments been carried out more extensively in this country the actual value of finely ground raw phosphates would have been demonstrated long ago. Basic slag being, however, introduced just when these experiments in the north had terminated, attention was naturally concentrated upon it, especially as the cost was then so low, and it naturally became the favoured material for field experiments, with increasing success; though, as will be seen from Table I., its solubility was greatly inferior to that of basic super.

Dr. DYER: But the solubility of basic slag in a stronger solution, such as 1 per cent, was much greater than that referred to in Table I.

Mr. HUGHES, continuing, said no doubt a 1 in 100 solution, would dissolve out more than his weaker solution, 1 to 1,000; but the relative solubility was still against basic slag and in favour of basic super, as the following figures clearly indicated:—

Comparison of Solubility.

1 grm. of each of these materials was treated respectively with 200 c.c. of 1 per cent. solution of citric acid, 400 c.c. of 0·5 per cent., 1,000 c.c. of 0·1 per cent., and 2,000 c.c. of 0·05 per cent.; allowed to stand 24 hours, with occasional stirring.

—	Basic Super.	Basic Slag.
Portion soluble in 200 c.c. 1 per cent..	94·70	64·70
,, ,, 400 ,, 0·5 ,, ..	95·30	54·50
,, ,, 1,000 ,, 0·1 ,, ...	95·70	38·30
,, ,, 2,000 ,, 0·05 ,, ...	92·40	30·30

It would be seen that, while the solubility of the basic super remained practically constant up to a dilution of only one part of citric acid in 2,000 parts cold water, the solubility of the basic slag declined with the dilution enormously. He could not agree with Dr. Dyer's suggestion that perhaps it would be more economical to use ground phosphate instead of slaked lime. The lime was hydrated and in a very soluble form, whereas the raw ground phosphate would be coarse or fine according to the grinding, and the action of the acid in the superphosphate would be directed rather upon the carbonate of lime than upon the phosphate of lime. In conclusion he would say that the new manure must stand upon its own merits; and it only remained for him to thank those gentlemen who had supported him in expressing their opinion that the manure would prove useful. Experience had shown that basic slag was a very valuable manure, and if his manure was still more soluble and rapidly available, as was indicated by its much greater solubility in the particularly weak solution of citric acid (1 in 1,000), he had every reason to hope that the field experiments would prove it to be a quick-acting and reliable manure, which was just what the farmer wanted.—*Journal of the Society of Chemical Industry.*

CULTIVATION OF SEEDS FOR OIL AND CAKE EXTRACTION.

SUNFLOWER AND CASTOR OIL PLANT.

SIR,—Seeing that there are some planters thinking of going in for the cultivation of sunflower seed (for oil extraction), I thought it might not be out of place to give a few particulars with reference to the growing and treatment of the seed to be converted into oil.

I think a valuable vegetable oil industry might be carried on in Ceylon if the planters would go in for the cultivation of the various kinds of oil plants, such as castor oil, sunflower seed, pea nuts, mustard, cotton seed, gingelly, and even olives, I think, might be grown to advantage.

I have extracted a very large quantity of oil from the above variety of seeds, grown in Victoria by the Department of Agriculture, in whose services I was for several years as manager of the department's mills.

To encourage the oil seed industry the department gave a bonus of £2 per acre to farmers to cultivate the seed for three years, and extracted the oil for them at a nominal cost, refining and packing the oil ready for the market.

If the Ceylon Government would do likewise, the planters would only be too glad to try some new industry to help them over the present very hard time.

Sunflower seed: 8 lbs. of seed per acre is enough to plant, the oil cake is excellent as a food for horses, cattle, pigs, &c., and is worth about £6 per ton for feeding purposes.

The best to grow for oil is the small black variety (grandiflora) as it yields the larger precentage of oil, 20 to 25 per cent of good oil, almost equal to the best olive oil; it is a first class table oil and there is always a good market for it if properly refined. When in Colombo I could let you see samples of the above oils if you care to inspect them. I hope to be down in a week or so.

Since writing the above, I see another correspondent asks information about the castor oil plant. There are two kinds of this seed that I have manufactured into oil, the large and small variety. The small is the best, as it contains from 40 to 42 per cent. oil; the price of the seed varies from R5 to R6 per cwt. It can be obtained in Bombay, and is grown in the Gujarat district; castor cake is worth from R40 to R50 per ton, and it is an excellent manure, as it contains a large percentage of nitrogen. It should find a ready market in Ceylon.

For "Palma Christi's" information:—

(1) In my opinion it is better to put in seed say 3'×3'—two seeds in a hole about 2.

(2) Bombay, that which is grown in Gujarat district is the best.

(3) After the seed is ripe enough, it is cut off in clusters, allowed to dry and then trampled on by bullocks, same as paddy, then collected and cleaned.

(4) About 40 bushels per acre, or more on good soil.

(5) There is a good market both in England and France for good castor seed, also oil; seed is worth say in Colombo from R5 to R6 per cwt. Castor cake should bring at least R40 to R50 per ton.

(6) By hydraulic pressure, a small plant could be got for £500 or 600, but this would depend on what power could be got on owner's property.

(7) In my opinion plants grown as an annual give best value. After seed is sown, there is little or no attention required until seed is ready for plucking.

(8) The plants would certainly crop best grown alone.

When in Colombo I could give you more information than by writing, such as cost of machinery, refining oil, &c.—Yours, &c.,

E. WILSON.

Engineer, Finlay Muir & Co.

Katugastota Estate, Katugastota, August 10th.—"Local Times."

WEEDS.—On new and unexhausted lands the bad effects of weed growth are doubtless due fully as much to the waste of moisture going on through their leaves as to the competition with the crop for plant-food. Hence all good orchardists are very careful about keeping their ground clear in summer; but it must not be forgotten that by doing so they quickly deplete their lands of vegetable matter which requires systematic replacement by green manuring if production is to continue normally, yet of the two evils, the loss of moisture is more to be dreaded, and very generally in practice the more difficult to remedy.—PROFESSOR HILGARD. Weeds in a dry country waste enormous quantities of soil moisture, each pound of weeds reducing the growth of corn by two pounds. Clean farming conserves moisture for the useful plants and useful plants produce more bulk as well as more value from a given amount if available moisture.—W. M. HAYS, Minnesota Agricultural Experiment Station.—*Agricultural Gazette of N. S. Wales.*

THE COCO-NUT.—INSECT ATTACKS AND THE VITALITY OF PLANTS &., &c.,

DR. BACHOFEU'S ANALYSIS OF THE COCONUT.

	Husk.	Shell,	Kernel.	Milk.
Total weight in lbs. ..	2·702	0·546	0·875	0·593
Do. in per cent..	57·28	11 59	18·54	12·58
* { Moisture in per cent ..	65·56	15·20	52·80	
{ Dry matter in per cent	34·44	84·80	47·20	
Pure ash in per cent ...	1·63	0·29	0·79	0·38
Containing viz :—				
Silica $Si O_2$	8·22	4·64	1·31	2·95
Oxide of iron and alumina, [$Fe_2 O_3$ $AL_2 O_3$ ...	0.54	1·39	0·59	Trace.
Lime, $Ca O$	4 14	6·26	3·10	7 43
Magnesia $Mg O$ ..	2 19	1·32	1·93	3·97
†Potash $K_2 O$	30·71	45·01	45·84	8 62
Soda $Na_2 O$	3·19	15·42		
†Potassium chloride KCL	...	..	13·04	41·09
Sodium chloride Na CL ..	45·95	15·56	5·01	26 32
Phosphoric acid $P_2 O_5$ ...	1·92	4·64	20·33	5·68
Sulphuric acid So_3 ...	3 13	5·75	8·79	3 94
	100·00	99 99	99·99	100·00
†Coutaining total potash K_2O ...	30 71	45.01	54·05	34·54
*Coutaining nitrogon N ...	0 137	0·100	0·504	

Thus of the more important ingredients of the soil 1,000 nuts remove the following :—

In Lbs.	Husk.	Shell.	Kernel.	Milk.	Total lbs.
Nitrogen N ..	3 7017	0·5460	4 4100	...	8 6577
Phosphoric acid P O ..	0 8456	0·0735	1·4053	0·1279	2·4523
Potash $K_2 O$ ...	13·5255	0·7127	3·7362	0·7783	18·7527
Lime Ca O ...	1·8234	0·0991	0·2143	0 1674	2·3042
Sodium chloride Na CL ...	20·2375	0·2464	0·3563	0·5431	21·4233

It will be seen that *sodium chloride* is found in the Coco-nut at 21 lb. to 1,000 nuts, and shows therefore that common salt should enter largely into all manurial material applied to this tree. One of the best and cheapest methods of applying this is to use the waste pickle of the salt provision stores, such as that from herring and pork barrels, &c. Other constituents should be supplied in a suitable manner, or in a form that comes cheapest. Chemists tell us, however, that we should not depend upon a single analysis, which is undoubtedly true, and therefore growers should know whether nuts of Trinidad, nuts of Tobago, nuts of Grenada, &c., &c., &c., would give the same results in the Laboratory as those obtained in Ceylon. It is reputed that the water or milk of the Coco-nut is a powerful diuretic, but to which of its constituents this property is due is not stated.

It is clear from the analysis that it is not sufficient merely to bury the nut in earth or sea sand to succeed in raising fine trees, but that such cultivation requires considerable attention, and the trees are benefitted, like all other plants, by the application of suitable manures when necessary. The want of such applications, where the plant food is deficient, undoubtedly leads to ill-health and subsequent insect attack.

The question of vitality in plants is not generally well understood, but it means everything to the cultivator. The Pine Apple in tho English hot-house is ruined by an attack of mealy-bug—but growing in the open under natural conditions and with all its requirements at command, the Pine Apple laughs at and despises the attack of this insect. Some stools of seedling sugar cane succumb to the attack of fungus and insect pests, while growing under exactly the same conditions as to culture, soil, and general attention, as their untouched stronger brothers (i.e), their vitality is low and their constitution weak, which renders them unable to survive. This vitality is also seen in fields newly planted, among cane cuttings planted on the same day on the same lands and under exactly the same conditions. One row will have but very few misses, while another variety will require supplying to the extent of 40 or 50 per cent. In some cases this is due, as is well known, to the condition of the cane ; for joints or tops containing a large amount of glucose are much quicker in developing growth than the hard or ripened joints which contain a major portion of sucrose. It may be argued that plants, if well cultivated, can have no weakness of constitution : but nevertheless, it can be shown in hundreds of instances that, where plants are exotics, it is a difficult matter to get them to thrive ; and their adaptability for culture often depends upon their power of becoming acclimatised (i.e.,) acquiring a strong constitution. Some plants never appear to acclimatise, and others are apparently ubiquitous and appear to adapt themselves to change of climate with greatest facility. From those facts it is fairly clear that the constitution plants possess is affected and also weakened or strengthened by several conditions.

1st, by inheritance ; 2nd, by temperature ; 3rd, by humidity ; 4th, by want of nutriment ; 5th, by unsuitable lands ; and 6th, by persistent attacks of fungoid or insect pests. So far as it is yet known, the best course to be followed, instead of using the nostrums often advocated, is to secure by hybridization and seminal selection, varieties possessing a vitality and strength of constitution which will enable them to overcome attacks of fungoid or insect enemies. It is of course admitted that the application of insecticides is often of the greatest service when the plant suffers from special invasions not due to want of cultivation, plant food, or lessened vitality, but the cultivator should be careful in discriminating between attacks caused by these wants, and attacks having a special character or cause. In the latter, insecticide can be used with advantage—in the former, even endless repetition of their use will not render them effective.—*Trinidad Bulletin.*

FIG GROWING IN SMYRNA,

In his report on the trade of Smyrna, Mr. Vice-Consul Hampson gives some information as to the cultivation of figs in Smyrna. He says that the fig district lies almost entirely along the Smyrna-Ardin Railway, the best quality of fruit called " erbeilli " coming from Inovasi, while those from Nasli and Sultan Hissar are also much valued, though their skins are thicker and lighter There are two kinds of figs, both from the same tree : those for eating and those for distilling purposes (hurdas). The fruit of trees growing on the plains is larger and richer in saccharine matter : but, on the other hand, the trees in the plains often suffer from excess of moisture in a wet season, which those on higher ground escape owing to facilities for draining. The trees begin to bear in their sixth year, and are in full vigour in their 15th year. The fruit ripens about the middle of August, when it is picked and dried in the open air for from three to six days. It is then packed in sacks of about 250lb. each, two of which constitute a load for each camel, by which means figs are carried to the nearest station to be conveyed by train to Caravan Bridge, Smyrna. Thence the sacks are again conveyed by camels to the depots of the purchasers. An attempt was made to employ carts (arabias) in the place of camels, but it was found that the fruit was damaged if the sacks were piled one on the other. The arrival of the camel load of figs in Smyrna each season is celebrated as a popular festival, as the washing, drying and packing of the fruit gives employment to thousands of families. The sale of dried figs for food takes place from the end of August till the begining of November, after which the sales are almost entirely of " hurdas " (figs for distilling.) A certain quantity of these latter are also sent to Austria-Hungary, where they are used as a substitute for chicory.

PRUNING FRUIT TREES.

The general principles of prnning have already been discussed in the previous issue of the *Journal of the Department of Agriculture*, and to these the reader must be referred. Several of the most approved methods of vine pruning have also been reviewed and illustrated by means of diagrams in the same publication. In this chapter the shaping and the pruning of the several varieties of those temperate clime fruit trees grown in our orchards will be more particularly referred to.

General Principles.

There are a few rules, however, which are applicable in every circumstance, and which should be borne in mind whatever the system of training or the kind of tree to be pruned may be. Thus, when pruning, cut off all dead wood; also one of any two branches which may happen to cross and rub against each other, thus chafing the bark and injuring the limb. Supress water shoots and suckers. When cutting to a bud do not leave a stump above the bud; but on the othor hand do not cut the wood off too close to that bnd. When compelled to cnt large limbs, pare off the wound with a sharp knife, and cover the wonnd with some dressing, such as already recommended in the previous chapter on pruning (p. 316), or even with clay, which, while preventing the air and the dampness from drying and rotting the wood, will not prevent the young bark overgrowing the wound aud gradually healing it. Before cutting the limb off try to see what the result of your action is likely to be a few years hence, and thns save at an early stage the possible necessity of having to cut large limbs at some fntnre period.

Should it be fonnd necessary to cut a large limb, saw it a short distance from the bottom first. Then saw down from above, and the limb can be removed without fear of splitting off below. Under the climatic conditions which prevail here, it is better to err on the side of cutting hard back, so as to keep the tree low, than on the side of sparing the tree the first year of its growth, and letting it run up a high stem, topped with long lanky branches.

Systems of Training and Shaping Fruit Trees.

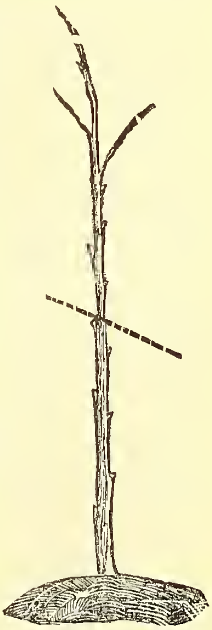
Climatic conditions to a great extent influence the methods of trainlng trees. Thus in colder climates they often trained *Cordon* fashion, or in *Espaliers*. Then again the *Pyramid* shape was for a long time a favorite in warmer climates, until the *Low Standard* or *Vase* system supplanted it.

This latter method of training fruit trees has been found by long experience to be the form best suited to the Australian climate; it is also the one best adapted to Californian conditions. Unlike the *pyramid* shape, which has the cone pointing upwards, the *vase*, *goblet* or *wine-glass* form, as it is at times called, rests on its cone, and directs its branches upwards and outwards

Amongst the advantages it offers it is simple to uuderstand and to master; it is applicable to all kinds of fruit trees; it is snitable to all localities where frnit trees can be grown out in the open without artifiicial shelter; it forms a vigorous, stocky tree, well balauced, easy to prune, spray and pick; it efficiently shelters the stem against sun scald; it resists the onslanghts of heavy gusts of wind better than the other forms of training; it reqnires less space than the *pyramid* form; it offers greater facility of approach to the stems by the horses when cultivating.

First Pruning.

Young budded trees in nursery rows present the first season of their growth the appearance of a straight switch, with good buds all along the stem. Sometimes they grow so vigorously that they throw out laterals. Both such young trees are found in nurseries. As their customers like to see as much growth as possible, nurserymen generally send out their trees withont cutting them back.



A Yearling Tree without Branches. The cross line shows where to cut back when planting.—Barry.

Experienced orchard owners generally prefer, when ordering from the nursery, one year old trees, which are merely straight switches with good buds all along the stem. These they can cut back to the height they prefer, with a length of stem pretty well uniformly the same all through the orchard. If they plant trees with a head ready formed in the nursery they cut it short back on the laterals. Those who, on the other hand, have little or no experience of fruit growing, would do wisely to select from the nursery trees with their heads ready formed. When cntting back, especially in the warmer and drier localities, a stem, 12 to 18 inches high, will be found the best. In the cooler districts it can be given a height of 18 to 24 inches. Cut back to a good bud, care having been taken that the tree has not been planted too deeply, but that its collar, or point of junction between the roots and the stem, be as nearly as possible flush with the snrface of the ground. If the tree has suffered much, and the buds are very small, the bark leathery and wrinkled, the stem somewhat dried and the roots much injured, it is advisable to cut the stem lower still, say at a height of abont 9 inches from the ground, or even lower, but in every case above the graft. In such cases, however, the proper height should be given to the stem, either by pinching the straight shoot which will grow from it, as soon as it reaches that desired height, or by cutting it back later on at the time of winter pruning. From stem topped to a height of 15 to 18

inches, several short shoots will be sent up from the upper buds; of these three or four of tho best shoots, placed symmetrically round tho stem, are allowed to grow, all superfluous vegetation being rubbed off. These three or four shoots, which will form the main limbs of the tree, should be placed in such a manner that they form a well-balanced head, and do not all como out together, but spriug out of the stem with an interval of an inch or two between them. This knits them better to the trunk, and they are thus less liable to split, as they sometimes do in windy weather, when grown in forks and laden with fruit. The apricot more especially, with buds very close together, has a tendency to grow its limbs all in a bunch,

Threo limbs growing symmetrically round the stem are better than four. During the first season, these three or four shoots are left to grow without interference, so as to favor as good a root system as possible. Should one of the rods, however, grow with such exuberant vigor that it draws all the sap for its own use, to the detriment of the other two or three, it would be advisable to pinch it off and check it, so as to maintain a fairly equal growth of the head. A tree is very easily thrown off its balance at this stage of its growth, and unless properly trained and watched it might be difficult susequently to re-establish the harmony of growth between the main branches that constitute the head.

Second Pruning.

During the summer following the first pruning, the young tree should be allowed to grow unchecked, so as to ensure a good root development. Some young trees, however, at times persist in sending up one solitary shoots. Should this be the case, the tender growth is pinched back when it has reached a length of five or six inches, and this will excite the bud immediately underneath into life, with the result that the three or four limbs required to form a well-balanced head will be secured.

Pruning of a two-year-old tree from the bud. —Barry.

The reverse at other times happens, the young trees sending up a bunch of shoots of such vigorous and luxuriant shoots that there is danger of the stems splitting. To guard against this, it is in such case also, although for a different purpose, advisable to take in the sails, and relieve the plant of any excess of shoots, or of its threatening top weight

During the first winter following the planting of a yearling tree, the three shoots, or may be the four, which constitute its head, are shortened to four to ten inches, according as to whether these shoots are feeble, or strong and vigorous. Fruit-growers often get their trees from the nursery at this stage of their growth, and the accompanying figure illustrates their shape after pruning. This operation excites the somewhat dormant buds at the base of the shoot into active life. As previously said, the terminal bud should be a plump and healthy one. It should be directed either upwards, downwards, or sideways, so as to prolong the growth of branch outwards or inwards, or towards a lateral blank space.

The growth of the main shoots is regulated by pinching, and should a third or fourth twig grow amongst them between the forks they are rubbed off. When the tree is ready for pruning a third time it has then, if three main limbs only, six branches, which, at tho time of the

Third Pruning

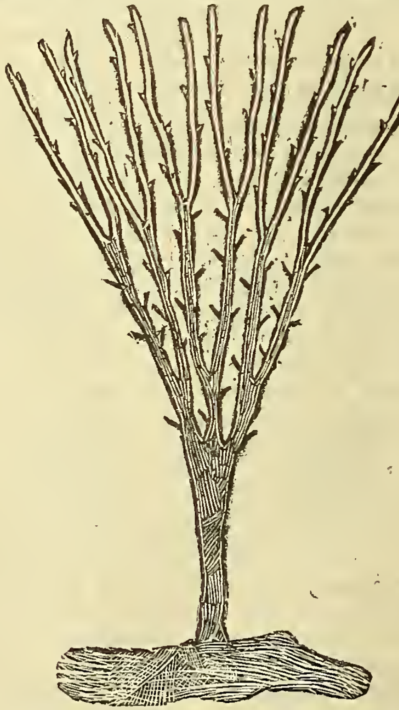
Are cut back to 6 to 12 inches, according to their strength. Two of the top shoots on each of these branches with an upward direction are left, and the lateral shoots from the other buds on the limbs below are pinched back in the summer time, when they are a few inches long, to four or five leaves.

These little tufts of leaves shelter the branches, strengthen them by coverting sap into woody tissues, and ultimately develop fruit spurs. Branches which approach the vertical line most are cut shorter than those inclined to an angle, to thus force the buds at the base to grow.

Winter Pruning of a tree three years from the bud.—Barry.

Fourth Pruning.

The same treatment described in the case of the first, second and third pruning is applied in the case of the fourth pruning, and generally at this age the tree will begin to bear readily. At this period a stocky, low standard tree will have been formed, which will have a well-balanced head, constituted of branches growing in an upward direction, and carrying fruit spurs all along their length. Such a tree will resist high winds well, can easily be approached by horse and implements, so that comparatively little hand-labour will be required to keep the orchard in a high state of cultivation; the crop will be evenly carried along the main branches, which will not stand in need of artificial props, lest they should break down under the load of fruit which, at this



Young standard tree, four years from the bud, after pruning.—Barry.

early stage, they will begin to carry. The pinching of the superabundant laterals is best done in the early autumn, when buds, which wonld otherwise have remained sterile, are transformed into fruit buds. This operation will besides save much butchering in the winter time, as, by suppressing either entirely or partly an undesirable shoot at an early stage, much sap, which would be turned into wood growth, destined to be cut off in the winter, is saved, and the energy and the vitality of the plant thrown into more useful channels. This practice leads to the enunciation of the fact that severe winter pruning induces wood growth, while summer pruning tends to fruit production. Thus, if a tree is stunted, and for some obscure reason does not make much wood, but shows a tendency to produce more fruit buds than it can safely carry, prune close in the winter; if, on the other hand, a tree grows so quickly that all its energy is wasted in wood and leaves, and does not pause to produce fruit, either summer pruning or root pruning will throw it into bearing. By such means the plant realising, while in full flow of sap, that its constitution has been attacked and its life menaced, will make an effort to reproduce its kind forthwith and the result will be the evolution of leaf buds into fruit-bearing spurs. Subsequent prunings consist mostly in rubbing off water shoots, in suppressing branches that cross and rub against one another, and trimming the twigs and the fresh growth made dnring the season's growth. As this stage the tree will have ceased making much wood, and will begin the business of setting and carrying fruit.

Reduction of Swellings and Hide-bound Trees.

At the time of pruning swellings are occasionally noticed on the stems or limbs of trees. These swellings are either due to the disproportionate growth of the scion or fruiting part, compared with the stock or root end of the tree.

They may also be due to strings used in previons seasons as ties, which have cut through the bark. These swelliugs, which intefere with the free circnlation of the sap, must be reduced. This is best done by rnnning longitudinal incisions from C downwards to the stock B. The bark will thus expand, and, should the deformity continue the next season, these incisions should be renewed.

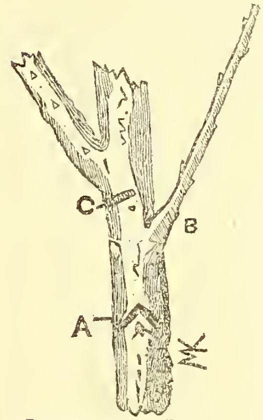
Trees which have been neglected, or whose growth has been stunted by the presence of moss and lichen, scale insects [or other pests, or by want of drainage of the soil, by the aridity and poverty of the ground, or are debilitated in consequence of having been allowed to bear too early, often show a miserable, sickly appearance. Their growth is stopped, the bark becomes tongh and leathery; they are hide-bonnd. The cause of the mischief may have already been removed, and still they will make no growth.

Incisions to reduce the swelling of the graft or the stem.

Such trees should be similarly treated at the time of pruning. They should be cnt hard back and at pruning time the knife should be run longitudinally through the bark, from the heel to the top of the stem, and even along the main limbs. It is also advisable to whitewash the stems of such trees. Lime, in the shape of whitewash, is well kuown to be beneficial in most bark diseases.

Under this treatment the stunted trees of last season are seen to spriug into fresh and healthier growth. The cambium or growing wood layers force the strip of leathery bark apart, the stems and limbs are soon seen to swell, the sap runs freely from the roots to the top branches of the plant and the whole growth looks healthier.

Incisions to Control the Growth of Shoots and Buds.



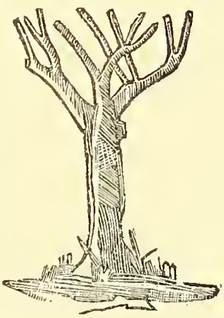
Incisions.—Du Brenil.

Should, during the preceding growing season, any one of the lateral branches have been imperfectly developed, it should be cut back lightly when pruning, and, if it is much too small compared with the others, it is sometimes advisable to make immediately above the point of attachment to the branch (B) a notch or small incision through the outside layers of growing wood, so as to force the sap to run up the branch and develop it. The cut should be prevented from healing too rapidly. It is also sometimes desirable for the symmetry of the tree to force a dormant bud into growth, and in that case an incision as shown at A will be found useful. On the other hand, should a strong branch become uncontrollable in spite of heading back, it may, in extreme cases, be advisable to check the flow of sap towards it by making an incision as shown at C, immediately below its poiut of attachment to the stem.

Thus we have a means of transforming wood bud into a fruit bud aud *vice versa*, by making a cut below the rudimentary bud if we want a fruit bud, or above if it we want a wood bud. These methods should, however, be only used with discrimination, else more harm than good will ensue.

Renovating Old Trees.

Fruit trees, planted in good soil and possessed of a good stem, are susceptible of living to a great age. It, however, often happens that through years of neglect their branches have grown to excessive length and are, to a great extent, deprived of fruit shoots, or that the crop is carried up too high, hence adding considerably to cost of gathering; or again the trees are diseased, and in order to successfully combat the pests which infect them they must be shortened in. Again the variety of fruit the tree bears may be unsuitable, and it may be expedient to change the variety by means of budding or of grafting. In all these cases it may be desirable, or even imperative, to shorten the tree and head it back. For that purpose the saw is called into requisition, and the cuts smoothly pared with a sharp knife, the wound being then smeard with clay, or with the shellac paint, or some of the other paint already referred to.


Top of an old plum tree headed back for the purpose of renovating.

The figure illustrates an old plum tree which has thus been renovated. The plum, better than most other fruit trees, stands cutting back hard to old wood without showing symptioms of dying back, which, under similar conditions, are often shown by apples and more particularly peaches and nectarines.

Early in the spring, the roots of the tree, which may be good for many years more, become active, the sap commences to move upwards and a number of hidden and dormant buds are excited into life. Shoots burst out of the old stumps and as they grow they should be thinned out to the nnmber of three or four only, woll placed and likely to form a

symmetrical head. Should these few shoots, which are destined to serve as main limbs, grow too rankly, they may be pinched or cut back during the summer and laterals will grow on the tree, which will be shortened at the time of winter pruning. Should, however, these shoots show only a moderate growth, they are better left alone until the pruning season, when they are cut back and treated as directed under the heading "First and Second Pruning."

Except in the case of plum trees referred to already, it is inadvisable to cut back trees in the process of renovation to blind stumps, but this should always be done just above a young branch or a small shoot, so situated that it can be used for giving start to the fresh growth. Old apple trees, apricots, and especially peaches are at times killed through overlooking this detail. The sap becomes stagnant, a dying-back process sets in, and carries off the limb. Peach trees more particularly must be cut back with judiciousness when it is intended to renovate them, the reason being that fewer buds are found on the old bark of peaches and nectarines than on the old bark of pippins, and what few buds there may be left are less easily thrown into active life again than buds of apple and pear treees. In the case of peach trees, indeed, the basal buds are frequently bloom-buds which blossom and then die off, leaving no wood buds to spring into life at a later period and send up fresh growing shoots.

When renovating trees of the citrus tribe, it is also advisable to cut large limbs above on young, fresh growth, although in their case this is not so essential as in the case of peaches. These trees are fairly well stocked with miniature, dormant buds, which are thrown into life whenever the emergency arises.—*Journal of the Department of Agriculture.*

A FEW NOTES ON CITRUS TREES AND ALSO WORKING OVER WORTHLESS OLD ORANGE AND PEACH TREES,

W. J. ALLEN.

In many of our citrus orchards are frequently found a few or perhaps a good number of trees which do not bear as well as they should, or it may be that the fruit is of such inferior quality as to be of comparatively little value. In such cases it would pay the grower, if the trees are vigorous, to cut them back and graft or bud the new shoots to varieties which have been found thriving and bearing well in the particular district. In California many good old seedling and other orange orchards have been treated in this way and worked largely to the Washington Navel, which is the most popular orange grown there.

While many growers in the Cumberland district might deem it advisable to rework some of their trees, there are but few who would care to bud to the navel, as, up to the present, most of those who have done so have found to their sorrow that the navel orange has proved a shy bearer with them, and consequently these feel disposed to rework such trees with other varieties which bear regular crops of fruit. The grower should be most careful that the buds or scions intended for use are taken from good trees, and not from young immature trees which have not yet justified their existence in the orchard.

In the orchard at the Hawkesbury Agricultural College I have been, and am even now, getting some of our worthless trees worked over to better varieties, and from time to time the Department is importing some of the best Californian varieties. In the accompanying illustrations I have had the artist photograph one specimen of each of the following Mandarins, viz.:—The Emperor, Scarlet, and Thorny—these three being largely grown throughout our citrus-growing districts. At some future time I hope to have the Beauty of Glen Retreat illustrated. Other illustrations show the progress made from year to year by worthless trees which have been cut back and reworked at the same orchard.

Fig. No. 1 (*a*) is a typical Emperor Mandarin tree, which is carrying a heavy crop of fruit. Up to the present time it has been found that this is one of the most profitable varieties to grow, and is a good mid-season variety. If held on the trees too long the fruit is likely to become very puffy in many districts. Should the Beauty of Glen Retreat prove to be a constant, heavy bearer it will no doubt supersede this and other varieties.

Fig. No. 1 (*b*) shows another style of Emperor Mandarin tree, started out nearer the ground and trained to spread wider, and not allowed to grow as high as fig No. 1. The tree is carrying a very heavy crop of fruit. The fruit is more easily picked from this tree, and the process of fumigating for the destruction of scale is carried out more easily in the case of this tree than in that fig. No. 1.

Fig. No. 2, a Scarlet Mandarin tree, heavily laden with fruit. The tree grows more upright than the Thorny and not so tall as the Emperor. A good cropper, fruit rather large and flat, but inclined to go puffy when kept on the tree any length of time. This variety has not found the same favour with growers as the Thorny and Emperor.

Fig. No. 3 shows the Thorny Mandarin tree. A very heavy cropper. Fruit small and rather flat. One of the best flavoured of all the Mandarins, and very much liked by the public. Ripens about the same time as the other varieties. The tree shown is a typical one, but at the time of photographing it was bending in all directions with the weight of its fruit, which, however, being green, does not show.

Fig. No. 4 shows an orange-tree cut down to force out new shoots preparatory to budding, which method I prefer to grafting, The tree will throw out numerous shoots, but as these grow the surplus ones should be removed, and only a few should be left, and these in positions where the new main limbs are required. If this work is carried on early in the spring there will be some good strong limbs by the fall, ready to receive the buds, which should be inserted about the first week in March, or just sufficiently late that they will not start into growth that autumn, but lie dormant until the following spring, when they will push out and form a very good tree by the next autumn, and in all probability some of them would carry a little fruit the second year.

Fig. No. 5 shows the tree at the time of budding, the buds being inserted at the base of the new growth.

Fig. No. 6 shows a tree after the new buds have made their first year's growth.

Fig. No. 7 is a Washington Navel tree two years after budding. Five fine oranges were picked from it this season, but owing to the visitation of night birds of prey it was thought advisable to pick them before they were coloured, and in consequence they do not show to advantage, as the rind would have been much thinner and the cells finer if the fruit could have been allowed to hang until properly ripe. It will, however, be seen that the size is all that could be desired. Fig. No. 8 shows the fruit before being cut, and fig. No. 9 shows the same orange cut in halves.

Fig. No. 10 shows an assorted row of best varieties of imported orange trees, two years from the dormant bud, and consisting of the following varieties, viz.:—Washington Navel Paper Rind, St. Michael, Mediterranean Sweet, Valencia Late, Egg-shaped St. Michael, and a few other varieties.

Fig. No. 11 shows part of a consignment of orange trees procured from California twelve months ago. All arrived in good condition and are doing well

The trees shown in figures 10 and 11 are worked on orange stocks, as were also the parent trees from which the buds were taken to work these trees, so that when they come into bearing it will give us a good idea as to their suitability for this district. The object in importing these trees was to ascertain which were the best and most profitable varieties to grow in this State, as also to prove whether it is the true Washington or some other variety of navel which has proved such a shy bearer with us.

As there are thousands of peach trees bearing poor fruit in the State, it will be of interest to many to have the reworking of such trees demonstrated. Fig. No. 12 shows a large peach-tree cut back during winter's pruning. If the grower wishes, however, he may leave them until the latter part of August, when they can be cut back and grafts inserted, by splitting the bark down the side, then raising the bark and inserting a scion between the wood and bark. Bind firmly with waxed cloth, and cover the cut with a thin coating of grafting wax. Should any of the grafts miss, buds may be inserted the following February in the new growth. All surplus growth should be rubbed off, leaving young shoots in such positions as are most desirable to start main branches, the latter to have buds inserted in the exact places where main branches are required. It is generally found best to bud on the outside of the tree as that generally gives the tree a good crown, whereas, if the buds are put on the inner side of the branches, the limbs grow towards the centre of the tree, making a very close and undesirable crown.

Fig. No. 13 is the same tree after it has made six months' growth. The buds will be inserted within a few inches of the base of the new growth. The top will be well cut back in the winter at pruning time, and the growth forced into the buds so that they will form a good crown.

Fig. No 14. A tree which has been cut back and budded—the buds showing the first summer's growth.

Fig, No. 15. The same tree as in fig. 14, two years after budding. It will be seen that this tree had longer arms left on it at time of cutting back than fig. No. 12, and consequently the tree is not nearly so well shaped as it would have been had the main branches been well cut back in the first place.

It will be seen that in treating a tree intended for reworking to better varieties it is best to cut it back to within 6 inches of the trunk rather than to leave arms 2 feet or more in length.—*Agricultural Gazette of N. S, Wales.*

CULTIVATION OF RUBBER TREES,

Some people may be surprised to learn that there is still a raw product that man finds just as difficult to obtain as it was a hundred years ago, and that it is harder to obtain than ever. It is the milk of a very insignificant-looking tree, growing in great quantities over a large tract of territory. The tree itself is generous; liquid follows the incision; a wait of a few hours for the milk to harden and a man has the equivalent of a day's wages. This white liquid, after exposure to heat, and many species to that of the sun alone, and without any further treatment, gives thirty per cent of its bulk in pure rubber. Despite this, the world cannot obtain a tithe of the supply it needs. The simple reason for this state of affairs is that the tree, although generous itself, elects to grow in regions which for the most part are death to white men, and are removed from civilization by thousands of miles of swamp and jungle.

To alter this condition of this two sets of men are working on opposite lines. They are engaged in a sort of race for a very high stake—an unusally high stake indeed, as the pure rubber is now selling for something more than $1 a pound. One set are chemists, who have been trying their best for the last twenty-five years to find a substitute for rubber. So far there has not been an unqualified success among their attempts, and there are experts who go so far as to say that chemically it is impossible to combine for the market a substitute having the different properties of pure rubber. Be that as it may, hardly a day passes but the long-expected substitute is brought forward and the company formed to exploit the perfect substitute of the year before goes into the hands of a receiver.

The field of activity of the other set of men is very different. It is found in a few farms in Mexico and Central America, and in a few government stations, notably in Jamaica and Ceylon. There are a small number of farms where something like a systematic attempt is being made to farm rubber on a large scale; some half dozen in the Isthmus to Tehuantepec and a very few more in Nicaragua, Costa Rica and the rest of Central America.

The difficulties which confront this handful of farmers are peculiar. In the first place, no one ever tried before to make rubber grow as a crop for the market. There are no data, no facts of even the simplest kind to tell these men whether their ideas are the right ones. The natives of the country take no interest in this outside their own particular business, and a man about to establish a plantation has had to start fresh, with his own ideas to guide him! and these latter cannot be said as yet to have become authoritative; for none of the farms are more than six years old, and the trees must be up that time before the question of growing them can be settled. Rubber planting, then, is not only an absolutely untried undertaking, but there has been nothing of tradition or general knowledge of the subject with which to make a start. If rubber were a delicate tree, or difficult to cultivate, the outlook would be disheartening indeed.

Second, the general conditions are against the planter. The nature of the country throws him entirely upon his own resources, and the climate is apt to be enervating, to say the least. Transportation is a great problem. Labour is scarce and not easy to handle, the native peon of Central America being a mixture of childishness and independence, and a hard drinker to boot. Although strong and active as young men, excellent axemen and better with a spade than any other labourers in the world, they become debilitated very early in life. They have no constitution and must be cared for like children. Furthermore, they look to the patron, or owner, for the settlement of every ill, spiritual or temporal. You must keep them sober, get them out of debt, make peace between them and their wives, arrange any infelicities that may occur between them and their neighbours' wives, doctor the whole family and educate the children, if you have time. For the peon is essentially a creature formed for the patriarchial system. With a chief or employer whom they know or respect the better class of peons become in many essentials ideal labourers—steady, careful, hard-working, quick to catch an idea, faithful to follow it out, entirely honest; their employer's interests become their own. But in order to obtain this desirable state of things a farmer should be a first-rate judge of capacity and character, a fair lawyer, physician and man of business.

A third problem before the farmer of rubber is where to plant. Castilloa elastica, for practical purposes the only rubber in Central America, has an extremely varied habitat. It it found at all elevations up to 2,000 feet and in a great variety of soils and locations, with a consequent variation of rainfall. So, here, again, the farmer must make a choice, and one upon which his success will probably depend, with nothing to guide him in the making. As regards location, it is conceded that Castilloa needs a tropical climate, a rainfall that

can be depended upon, a good drainage, and an elevation of less than 1,500 feet, but these conditions have great latitude of choice.

The most important ot the questions relative to the method of planting rubber is the one about which the farmers are most divided, and is probably the most vital connected with its cultivation. It is the question whether to plant in groves, in the open, or under forest shade. The advocate of the former system says that in any other part of the world, if one wants to get a particular crop, it is customary to give the tree or plant all the chance possible. One clears the ground, turns it up, and after the tree is planted keeps all weeds from encroaching upon its light and food space. Why not apply these elementary principles to rubber and plant in plowed and open land, in groves, like an apple orchard?

The advocate of the forestry system points, however, to the manner in which the tree grows naturally and says that rubber is found thriving best under shade, in a cool, wet spot, and by "thriving" he says he means gives the most rubber. The tree will grow, it is quite true, faster in the open than in the forest, and you will get your groves of rubber trees more quickly, but the question is, Will you get the milk from them? For it does seem to be a fact that rubber found in open pastures will not yield so much milk as those trees growing in the forest, where it is cooler and moister. If it could be ascertained exactly what function the milk of the tree performed, one would probably be able to telt how much sun and how much rain would produce the tree with the largest quantity of rubber. The milk is not a sap, but a latex, which is carried just under the outer bark, and the slightest nick from a pen-knife will be followed by a thick liquid, which if caught on the finger dries at once, leaving a shred or two of pure rubber, like small elastic bands.

There are farms established by exponents of each theory. One can see in Mexico rows of young trees in open cleared land, in every respect like a coffee or orange plantation; and again in Costa Rica the farm consists of rubber trees planted in among the forest trees, only cleared where the growth is very thick, though of course the bush is kept down by cutting twice a year. Those who are following these two theories will be relieved when they get their first crop. But at present they are having rather an anxious time of it, for on the one hand it will be expensive business, not to say impossible, to plant shade among those trees in the open, and the rubber may be ruined before the shade comes up. But this course would be imperative should the advocates of the orchard theory find themselves in the wrong. On the other hand, should the forestry people be at fault, it will require considerable skill for the owner of the rubber growing in the forest to cut out the trees and let in the sun without injuring the rubber. Ringing trees at the right phases of the moon, some eminent scientists to the contrary notwithstanding, will go far toward solving the problem for the grower of rubber in the forest and make his position the stronger of the two, on the whole, in that he runs the lesser risk, as it is easier to cut out the shade than to put it back.

As for the rubber planter's profits nothing definite can be said about them as yet. A man might buy a thousand acres of good rubber land for $5,000, and he might plant it and bring it to production for $45,000 more—$50,000 in all. But now as to the returns, it is like figuring on the chicken industry; one becomes alarmod at the rate chickens, eggs and profits pile up. In the same way it is estimated that rubber will produce a handsome return every year at the end of of the sixth year from planting. Anyone can work out for himself the following sum in multiplication for the profits of the eighth year: One thousand acres with 200 trees to the acre, one pound of rubber to the tree each year, sold at a net profit of 50 cents a pound.—*Agricultural Gazette.*

VANILLA CULTIVATION.

To judge by occasional notes, which appear in our planting journals, this product appears to be having its full share of attention at the hands of those planters who are on the alert for anything in the shape of a profitable auxiliary to the main crop they may be growing. In certain planting districts it is being propagated year by year with the view of raising a sufficient number of plants to form a plantation of an acre or so, in order that a regular squad of people may be told off specially to look after the plants. This is absolutely necssary, and is the right way to go about the matter,—where there are only a few plants scattered here and there about a compound, they cannot get that special attention which is necessary to forming an opinion as to whether the raising of them on a larger scale will be a profitable undertaking. Of course there is always the probability of over-production, and this ought to be steadily kept in view, and nothing but the very best quality of pods put upon the market. If we may take South Sylhet, for instance, which, by the way, we are inclined to place in the very first front rank amongst planting communities, in the matter of the introducing and cultivating of valuable plants from other regions with an analogous climate and habitat, we can see no reason whatever why that district should not make a name for itself for a good quality of vanilla.

The large majority of our planting districts in Assam will grow vanilla. There are a few districts in Upper Assam, which are sometimes too cold and damp during the winter months, and the plants get what is known as "spot." This is not what we should call a disease, but simply a "hurt" caused by water resting upon the leaf when the atmosphere is at a low temperature. The vanilla "plant" will stand a much lower temperature than any we ever get in the vallay of Assam, but it will not tolerate dampness as well. Even in the South Sylhet district, where we never get such a degree of cold as is usually experienced in Upper Assam, vanilla will not succeed in a lowlying situations where there is sufficient moisture during the dry season to cause a continual raw feeling during the day.

That it grows, flowers, sets and grows pods of as good quality as are produced in the Seychelles Islands has been already proved. The prices have been well maintained, for many years past, despite the invention of vanilla (the coal tar product) which has not commended itself as anything likely to be a competitor, where the real vegetable product is to be had. There are lands more suitable for its cultivation than others, but any ordinary forest land with a good surface accumulation of vegetable mould will be found adaptable for the cultivation of vanilla. At the same time, vanilla-growing, being one of the most concentrated of Agri-Horticultural industries, can be grown upon the most barren of lands, in the absence of other unfavourable conditions. The writer is not aware as to what size the vanilla plantations of Reunion and Mauritius run, but we may take it that a 5-acre vanilla garden would be considered a very large "auxiliary" indeed to a 500-acre tea garden. And if 5 acres of first-class forest land could not be had, 5 acres of scrub jungle could very easily be made almost as suitable by carrying fresh jungle soil to plant the vanilla plants in. It would cost no more than it does to make large pits and fill them with fresh soil—a necessary work when filling tea vacancies if any measure of success is to be counted upon. The Mexican system of allowing the vines to grow under trees nearly wild appears to be almost universally adopted now, and is a decided improvement on the old system of training the vine on artificial supports. According to a report on the

vanilla growing in Seychelles nothing pays better than vanilla. Its production costs the planter about Rs. 3 per lb., and as prices vary from Rs. 8 to Rs. 16 per lb., a net profit of from Rs. 5 to Rs. 13 is the result. The average price was Rs. 15 in 1898, and at the present time runs much about the same. The yield may safely be taken to be 200 lbs. an acre according to the report above alluded to. "Taking, therefore, an average of Rs. 10 only, an acre of vanilla should produce Rs. 2,000." Five acres of vanilla at this rate would not come amiss to plenty of large tea concerns, to say nothing of small ones.

It would even pay them to keep a European who throughly understood the plant, its growth, fertilisation (which has to be done artificially) and last, but by no means least, the curing, sizing, and packing. The object of this article is not to make planters believe that thay have nothing to do but procure vanilla plants, stick them in and wait for the pods to come. We may go the length of asserting that out of every 100 planters who attempted vanilla growing 98 would very probably not succeed. It requires special knowledge all through as to the habits of the plants and its requirements. The curing alone requires considerable study, care and experience. The plant when growing, although preferring to take its own sweet will during its adolescence, is entirely helpless when it comes to maturity. It will keep on growing certainly, but is quite incapable without human aid of reproducing its own species; consequently, if this process is not understood, the growers will have no produce in the shape of the fragrant vanilla pods of commerce.

Whatever may happen in the future the industry is not suffering at present from over-production to the extent of affecting the profitable nature of the industry. In 1898 the vanilla crop of the Seychelles amounted to 63,000 lb., and was sold for Rs. 936,000. It cannot be gainsaid that the large output of vanilla has given a fresh impetus to its cultivators, and large quantities have been planted during the last two years. Still, according to the chemist and druggist, the consumption of vanilla pods is increasing every year and likely to continue to do so far a long time.—"A. P." in *Capital*.

COFFEE CULTIVATION IN BRITISH CENTRAL AFRICA.

To the flowering of coffee the planter looks for a forecast of the season's crop. Naturally one would expect this to be correct, but, for several reasons, it cannot always be depended upon. It is now well known that *Antestia variegata* is responsible for the reduction of both the flower and the berries after they have been formed. Drought was supposed to do considerable damage also, and, in fact, is the reason given for the failure of so much crop. I assumed this as correct, and, by some notes on the subject to the *Central African Times*, I concluded that, with the destruction of *Antestia variegata*, and a system of irrigation, our success in coffee production was assured. Now I must admit I have been misled, and, therefore, made a mistake. My views of the subject now are that irrigation would do very little good, and that it is not the roots that require moisture, but the plant above ground. This drought which wo get occasionally is not directly the cause of our failure of crop, or the burnt-up or dead appearance of our plants, but of course it is so indirectly.

From my observations I with no hesitation declare thrips to be almost the sole cause of this damage put down to sun and heat. Damage caused by sun and heat is relatively so immaterial that little account need be taken of it. We have thrips every dry season, and it is only the want of rain or a drought which helps to bring them forth in such vast numbers. At the beginning of the dry season they are few and far between, but become more conspicuous towards its close. Some time before the wet season commences, I should say, they are found at the very least to average a dozen larvæ to every leaf, and the whole of the underside of that leaf is sucked and discoloured completely. The time when the destruction is disatrous is immediately after the coffee has flowered. Here are tender berries much superior in the estimation of thrips to leaves months old, or leaves that they have been living on and sucked from the under side, giving them the appearance of pieces of brown paper hanging from the branches instead of leaves, and now discarded for berries. Ultimately these leaves fall off, leaving the branch and berries black and dead.

Thrips are first seen as minute red insects generally with a drop of dark fluid or excrement attached to their abdomen; they afterwards change to a lighter green than the colour of the leaf; a few of the imago or perfect insect with wings and dark body are also observed. The elongated abdomen of the larvæ gives them the appearance of minute worms or caterpillars. In fact, there is sometimes seen on the coffee leaves a grub resembling them which is not unlike the larva of a fly. Wherever they are they darken the leaf, tender stem, and berries by their puncture and excrement.

As to the possibility and feasibility of destroying or keeping thrips in check by hand picking in their initial stages, I am not in a position to say at present.

Besides hand-picking we have another alternative; we are aware that some seasons we get a shower every month; those showers and everything else being favourable, we get a good crop; in other seasons these beneficial showers fail to come, and our crop is more or less a failure. Now those monthly showers have been the means of keeping the thrips in check. Likewise the wet season almost completely overwhelm them. From these facts we may conclude that spraying with a syringe or a garden engine is the next best thing, and with the addition of tobacco juice or any other insecticide less spraying may be required.

There can be little doubt as to thrips being indigenous, and possibly new to science. The nearest approach I can get to the species of thrips on coffee, is one found on grass, which may be the same species or quite different. To me it appears smaller or shorter. The result of thrips on grass is that they are accompained by a fungus. This fungus is red, and can be easily noticed; it is on the under side of the blade, but can be seen from the top, so that grass with thrips can be easily detected. This grass had not been burnt in the previous year with bush fires; on grass that had been burnt, or grass grown from seed, I have not noticed them. The appearance of this fungus in most cases resembles the larvæ of thrips in their red stage.

The next nearest approach to the species found on coffee is one found on a shrub, *Dissotis princeps*, growing in our marshes.

Thrips belong to the Thysanoptera order, and like our plant bugs imbibe the juice of plants by suction.

At the recommendation of Dr. Sharp, F.R.S., Cambridge University, I have sent all the specimens of thrips, &c., to Miss Embleton, Balfour Laboratory of the abovo University, for identification, and any advice which may be of use to us in the matter.

Kenneth J. Cameron.

Namasi, Feb, 26th, 1901.

—*Journal of the Society of Arts.*

SHIKAR AND TRAVEL: ONLY A CUP.

That there was a tigress in the jungles somewhere near my camp I knew, but she could not be persuaded to kill any of the baits that I had had tied up for

her. Her tracks one morning showed that she had gone along a nullah not ten yards from one of the tied-up bullocks, but she had not touched it, and it seemed as if she fed on game only, as no damage to any of the cattle herds in the neighbourhood had been reported. I had quite given up all hope of getting a shot at her, and had, on my last day at the village of A., arranged for coolies to be collected to beat through a hill near my camp which was a sure find for bear if only they could be persuaded to break which was not always the case, as there wore so many caves in the hillside), when word was brought that a kill had taken place in a nullah between the bear's hill and my camp. On going to inspect the place where this had happened, I found that the carcase had only been dragged a short way from the nullah into the junglo along its banks, and hut little of it had heen eaten. The tracks showed that there was a cub with the tigress—a fact of which I had not been aware, and the tracks further showed that after their meal the two animals had separated, the cub remaining in the jungle near by while its mother had returned by the way she had come to the kill. For about two miles we followed her tracks which led us away from the nullah, and then they struck a small village path and we lost them. This was disappointing; but there was the chance that the tigress had gone round by some other way to join its cub, so I gave up all thought of having a bear beat, and instead made arrangements to beat along the foot of the hill on both sides of the nullah for the cub, and, if possible, for its mother too. The spot that I selected for my station was on the side of a small dried-up stream (a tributary in the rainy season of the nullah where the kill had taken place); all around me was grass jungle with scattered trees, and about 400 yards to my left was the bear's hill. Directly behind me, about 600 yards away, was another hill, for which it was anticipated the tigers would make on being disturbed. It was necessary, in such a grass jungle to have a large number of stops, for although the grass was high and thick it was not matted, and a tiger could get through it easily anywhere, so I selected forty of the least stupid-looking from among the coolies assembled and placed twenty on each side of me, those on the left extending up to the foot of the hill. While laying the stops on the left my "shikari" came face to face with the tigress who was sleeping alone—the cub not being with her, at least my "shikari" did not see it—in a small depression at the foot of the hill. Fortunately, on being disturbed, she bounded off into the forest through which the beaters were to pass.

I had waited about two hours in my *machan* before I heard the welcome sound of the beaters advancing and, as I lifted up and cocked my rifle, I scared a covey of bush quail, that had allowed me to watch them feeding among the sal leaves below me and they scurried away across the dry stream and into the grass on my right. Ten minutes later I heard the sound of an animal coming towards me on my right; at first I thought it must be the tigress as it made so much noise among the dry leaves in the nullah, but it was only a four-horned antelope buck that stood and looked at me and offered a most tempting shot at twenty yards which, of course, I did not take. Then after another wait of 10 or 15 minutes, the tiger-cub appeared. It came towards me across the bed of the nullah at a good rate, and I fired, when it was almost below me, between the shoulders, killing it at once.

All this time I was not aware that the tigress was in the beat, as my *shikari* did not tell me till afterwards that he had almost stumbled upon her as he was laying out the stops, and I was consequently very pleased to hear a low growl that could only come from her, soon after I had shot the cub. I heard her moving about the bed of the nullah, apparently coming and recrossing it, and though I imagine she saw me, I never caught a glimpse of her, until the beaters were nearly up to her, and then she sprang across the nullah and through the grass to my left offering me two snap shots, both of which were unfortunately misses. They were both difficult shots: the first among the trees, and as there was a bend in the nullah when she crossed it, I could not get a clear view of her; and the second, in the long grass. The latter I ought to have made fairly sure of, but as I was on the point of firing I noticed that one of the stops, who was in a low tree to my left and rather below me, was almost in the line of fire, and I had to hold my fire until the tigress got well clear of this line. This delay put me off my shot, and, in all probability, accounted for my miss. After the beaters had come up, and I had searched carefully to see if either of my shots at the tigress had taken effect, I decided on another beat, through the low hill that I have already said was situated behind where I had been stationed. The tigress' track lay straight in this direction, and it appeared as if she must be lying up there; but the beat which was a miserable, uncomfortable one, as a drizzling rain set in while the stops were being placed, proved blank, and we found that the tigress had made for this hill; but instead of ascending it, she had skirted along its foot and gone thence to some thick jungle and hills to the south-west. It was too late then to think of trying to hunt her up there, for I had 8 miles to go to my next camp and the sun was then very near the horizon, so I had to be contented with the cub I had bagged, and leave the mother for some future occasion.

ANTONG, *Raipur, C.P.* LONG TOM.

Indian Forester.

GLASGOW EXHIBITION; BLACKMAN EXPORT COMPANY LTD.—The Blackman Company's Exhibit 700 sq. feet is an interesting one. Seventeen of their well-known Blackman Fans are shown in motion, the largest of which, 96 inches in diameter, is driven from the shafting overhead by means of a belt; others varying from 72" to 12" in diameter are driven direct by electric current, these Fans being combined with Electric Motors of the Company's own manufacture, especially designed for this class of work. Four of the Fans deliver air, warm or cold at pleasure, from the four sides of the upper part of a central column or Kiosk, which is a prominent feature of the stand. On this stand there is also a Model Drying Installation consisting of a drying compartment arranged in conjunction with a Blackman Electric Fan 24" in diameter and suitable Radiators for heating the air. The main advantages gained by the Blackman System of drying is that almost every class of material and produce is effectively and rapidly treated with the greatest economy both in cost of drying and in the space occupied by the drying chambers whilst the quality of the material so dried is much superior to that baked or stewed in closed stoves. Twenty-four Blackman Electric Fans are used for ventilating the Restaurants in different parts of the exhibition. Messrs. McKillip & McKenzie have 14 of them, from 24" to 42" in diameter, in Restaurants Nos. 1, 2 and 3, where their cooling and ventilating effect is highly appreciated. Four others of similar sizes are used by by Mr. Jenkins, in Restaurant No. 5: two more in the Indian Theatre, and two in the Bermaline Model Bakery. An imposing addition to the Exhibit is a large assortment of Keith's patent Hydraulic Rams and pumps, heating Apparatus, and High Pressure Gas lamps of great brilliancy, for which the Blackman Export Company Ltd., of 70, Finsbury Pavement, London, E. C., are the Exporting Agents.

RHODODENDRONS.

After the floral flood-tide of early spring, there is a brief but perceptible ebb in the beauty of the lawn and garden-border. The ever-welcome bulbs, whose gay but not deep colourings remind us a little of the tremulous winter sunshine, have had their hardy day, and Nature pauses as if to gather strength for the production of the richer and riper beauties of the glowing summer. But this wonderful pause is garlanded for us with a magnificent display of flowers, which belong to the landscape rather than the parterre. They do not easily lend themselves to the restrictions of "interiors," nor to the narrow embraces of the flower-vase. But when a dry May-month gives them their opportunity the tree flowers are not to be surpassed for the veritable enchantment which they work upon the scene. The half-dozen homely kinds upon which we customarily rely for this magical effect have been this year close confederates and have conspired to delight us by an almost simultaneous effort. The white and pink of the chestnuts have challenged the white and pink of the hawthorn. Honours are fairly easy, but, as if to abate any nascent feeling of rivalry, the softer syringa with its white and "lilac" has held a commanding position between its loftier fellows. And the golden tassels of the laburnum have so brightened and relieved the competition that the wide sylvan stage has been a scene of the most refreshing variety and enjoyment.

Flora thus descends to our meadows and pastures by way of the trees; and true to time and season, and her own good will, she finally alights upon the lawn in a blaze of triumph lighted among the dark evergreen leaves of the rhododendrons. The fire has been smouldering for some days, but the punctuality of the plants in "lighting up" is proverbial. They seem to claim the early days of June as their special prerogative, and seldom indeed do they disappoint us. As handsome evergreen shrubs they do splendid service all through the year: and when their too-fleeting glories have passed away, we may enter the portals of the garden proper, with all its marvellous assortment of "bedded-out" plants, making themselves at home, and gradually expanding into blossom. But for the moment, the rhododendrons hold us; nor are we in the least doubt as to the point of view from which they are, and should be, popularly regarded. The botanist tells us—in the seemingly callous, but perhaps necessary, way which makes so many persons shrink from him—that "the rhododendron is a genus of glabrous, pubescent, tomentose, or lepidoted shrub." Not even Mrs Gamp herself would have been provoked into a "deniging" of this proposition. But a pleasant voice floats across the lawn freighted with a dictum much more germane to the occasion. "Are they not perfectly lovely?" The precise value of which phrase lies in the intonation, which, unhappily is not producible in print. But it is true—so far as it goes. Critics, indeed, might demur to it, as placing the rhododendron on the same plane of comparison as its latest fanciful imitation in ladies' headgear. But that is a captious objection. The flowers are lovely. The mere man only employs a more square-set word when he calls them magnificent.

When the early settlers in Virginia had time to look about them their first astonishment was at the splendour of the autumnal forest tints. Against the dark livery of the pines were set the golden yellow of the beech, the red foliage of the maple, and the glories of the scarlet oak. But another natural feature presently drew their eyes downward. The mountain-sides and valleys were thickly covered with a handsome shrub which they soon learned to call the mountain laurel, and which in its season bore abundant flowers of a "pale blush." This was simply the quite unauthorised American edition of the rhododendron, which does not appear to have found its way to England much before the beginning of the last century. Even its great Oriental predecessor, the Pontic rhododendron, from which so many of our present varieties have sprung, was little known among us before the early years of the 18th century. Since that time, however, the florists have found the tribe so very teachable that they have devoted much time and skill to their higher instruction. Both the oleander and azalea are scientifically included in the family, which even at the beginning of its school career was one of the greatest promise. And now in the parks of town and country rhododendrons have long been flowers of course. Planted "walks" have enlivened the more sombre vistas of forest scenery, and no garden which attains to the dignity of a lawn can now afford to dispense with them. The very severity of their dark, leathery, but always attractive, leafage affords only the greater contrast to the vivid splendour of the flowers. The colours of the more delicate greenhouse kinds are a wonderful feast for the eye, passing from white to silvery, and through the softest sulphur-shades to yellow and deepest orange. In another direction we are led through the gradations of rose and mauve to the most gorgeous depths of crimson and purple. Nor are their open-air sisters much behind them, though here we are scarcely in the mood for nice discrimination. The flowers strike us by their splendid massing, and the one truth which impresses us is that they are the glory of the lawn in early June.

Travellers take pleasure in assuring us that we know but little of the possibilities of the rhododendrons until we have seen their lavish beauties in the Himalayas. It may well be so, but then the entire natural scale differs accordingly, and contrast is only greater or less by the sum of its surroundings. We are standing on a verdant stretch of English turf, and, at least for the moment, are willing to leave comparisons to those who seek them. Our own varieties are "beautiful exceedingly," and that suffices. The plants yield their blossoms freely; there is nothing of the coyness and reluctance which seems a natural, though not always unpleasant, feature of so many of our English beauties. But this is mainly due to the shrub's natural habit. When once the rhododendron is in flower, it seems to be all flower, because the innumerable blooms are so completely unveiled. Every flower-head is a mass of separate flowers, the calyx of each being so very slight that the whole beauty of the bloom is unfolded. Let us gaze at the rhododendrons while we may. Fast fleets their transient beauty, and the greater perhaps is the delight of its return.—*Globe*, June 10th.

A TYPICAL MEXICAN RUBBER PLANTER.

The "India Rubber World" has published so much in the last few months regarding the planting of India-rubber in Mexico, that further information regarding the individuals who have made a study of this question should be of interest to its readers

The following is a brief sketch regarding Mr. Maxwell Riddle who is now acting as general manager and treasurer of the Republic Development Co., which is engaged in planting a large property for the Obispo Rubber Plantation Co., on the isthmus of Tehuautepec.

Mr. Riddle was born in Ravenna, Ohio, where his father has been engaged in the manufacture of carriages for nearly half a century. On leaving college Mr Riddle entered his father's office and started to learn the details of carriage manufacturing. During the course of the six years which he devoted to this business, he became much impressed with the increasing use of rubber in rubber tyres, which led him to a study of the sources of supply for the crude product, and then to the question of rubber planting, in the investigation of which he was assisted greatly by the Bureau of American Republics in Washington, the various foreign consuls, and the late Minister Romero. After studying the question for more than a year, he started on a trip through Central America to learn for himself the facts regarding this interesting question.

After a long trip through Central America he visited various localities in Mexico, making a particularly thorough examination of the plantations in the states of Vera Cruz, Oaxaca, Chiapas and Tabasco. He found that the true rubber belt in Mexico was a narrow strip of land following the border of the states of Vera Cruz and Oaxaca and continuing along the border of the states of Chiapas and Tabasco. This narrow strip having been enriched for centuries by the wash from the mountains behind it, and being drenched by the continuous rains due to its proximity to the great plateau, made it ideal for the cultivation of tropical products. He decided to purchase a property near the border of Oaxaca and Vera Cruz. After returning to the United States for a short trip, he went back to Mexico and started planting his property in earnest, and has now set out more than 100,000 trees, which he reports are doing magnificently. During the year 1899 he became interested with Chicago capitalists, chief of whom was Mr Alfred Bishop Mason, president of the Vera Cruz and Pacific railway, in the purchase of a tract of 2,500 acres in the state of Vera Cruz to be planted in rubber and sugar oane and pasturage for cattle. This company have already succeeded in putting their plantation on a dividend-paying basis and are anticipating very large returns when their rubber is in bearing.

Some months ago some capitalists in New York, recognizing the value of Mr Riddle's praotical experience as a planter, induced him to become associated with them as general manager of the Republic Development Co., now planting about 1,500,000 trees on their Obispo plantation in Oxaca. Mr Riddle is compelled to make frequent trips between Mexico and the United States, and the proper management of this plantation, as well as his private place, keeps him very busy. He reports that they have had no difficulty in getting all the labor they could use up to the present time, and anticipates no difficulty in the immediate future, as the large town of Tuxtepec is within walking distance of the plantation, and the men much prefer to work on a place where they can get into town to see their friends on Sunday. He reports also that the town of Tuxtepec ships a large amount of crude rubber every year, much of it coming from the region immediately adjoining their plantation. Although their system of planting requires the burning of the timber and the underbrush, they are in hopes of saving many of the wild trees, the returns from which will assist materially in paying dividends.

It is encouraging to see people of Mr Riddle's business experience engage in this important undertaking. The question is becoming recognized as of vital importance to the rubber manufacturers, and when men of training and experience take hold of it, its ultimate success seems assured.—*India Rubber World*, June 1.

AFTER CROCODILES IN CEYLON.

(By Tom-Tit.)

To the sportsman who has time and means to spend amongst elephants, buffalo, and deer, the attractions offered by the crocodile will perchance not be very great. But, as elephants and buffalo are scarce, and the pursuit of them an enjoyment entailing great expenditure and much equipment, there are many who are glad indeed to spend a day or two after the crafty saurian, especially as these days are usually attended by a little diversion among the innumerable wild owl which share their haunts. The two species that will most interest the sportsman in Ceylon or India are the estuarine and the marsh crocodile. The former are ferocious brutes, which frequent the mouths of rivers and salt-water lakes by the sea, feeding on anything from a bird to a bullock, and only too often on human beings. The marsh crocodile is very common in Ceylon, and is to be found in most rivers and lakes all over the country. It grows to an enormous size, though to shoot anything over 15 feet is not common. The "mugger," as it is often called, seldom attacks man, unless it is wounded or its nest molested, when it becomes a savage and dangerous customer.

Most crocodiles feed and roam at night, returning to the water before dawn, and leaving it again to bask when the sun is at its hottest, about noon. Their favourite basking haunts are on shelving rocks and mounds of sand or mud that have silted up during flood time; and in tidal waters on mudbanks left by the receding tide. In unfrequented localities it is easy to approach crocodiles in a canoe at mid-day, as they are then usually asleep or dozing on the sand spits and rocks, and can be shot before reaching the water. They become very wary, however, if often molested.

Crocodile shooting, if not the highest form of sport, is at least exceedingly good fun. The outfit required for an expedition of a few days is by no means extensive; a folding canoe, a double or repeating rifle, a tent, some rope, and a sharp grappling iron, skinning knives, food and cooking apparatus about make up the list. When staying with a coconut planter near Batticaloa some years ago, I was much attracted by the wonderful lake or fresh water lagoon which extends over thirty miles along the coast—a perfect chaos of islets, river mouths, and mangrove swamps. This lake teems with fish and wildfowl, and some parts of its serrated edges literally swarm with crocodiles. Cranes, pelicans, duck, snipe, and endless varieties of aquatic birds find sanctuary on the many islands and swampy nooks: while at night the place is alive with crabs, crocodiles, and snakes, which seek their food to the tune of mysterious "musical shell fish," which live at the bottom of the lagoon, and tinkle away all night, the effect in toto of these myriads of tiny voices vibrating to the surface of the still water being very impressive.

But to return to the crocodiles, which range in size from a few inches to twenty feet. I soon found out the whereabouts of some of the monsters—the old ones frequent the same spot for years—and we decided to have a good try for some of them. My host, who was an old hand at the game, sent a couple of coolies on with our tent etc. in a bullock cart giving them some instructions about mosquito nets

the value of which I afterwards appreciated. When we arrived all was ready, the coolies having, at my friend's dictation, arranged some very effective bait, consisting of two dead dogs, cut open and secured to the ground by stakes about twenty yards apart. When it was dark, and just before the moon rose, we crept down to within a few yards of our baits, and, taking the best cover we could find, waited for whatever might turn up. After a little time our friends began to show themselves—and ugly beggars they looked in the moonlight, slowly crawling out of the water, with that hideous, jerky motion peculiar to the saurian. It was not long before our dainty offerings, which were about fifteen yards from the water's edge, were discovered. One, and then another, approached the bait opposite me, and as the creeping monsters drew nearer I became conscious of a feeling of nausea I had never felt before. But the excitement of the moment soon overcame any other emotion, and, picking out the longest reptile, I covered him and waited for the signal from my companion. That wait must have made my hand unsteady, for when the signal came and we both fired, I saw my gentleman turn and make for the water as hard as he could shuffle. I was using a Colt 44 repeater, and gave him two more before he splashed into the water after the others. My companion had done better, having placed a 450 bullet slap in the brain of his beast which was a fine one.

We left the coolies to skin him and anchor his carcass in a suitable spot as an enticement to his cannibal brethren to return, and, launching the canoe, started off for another place, where we were pretty sure of a find. But the moon clouded over, and we had to give it up and turn in, which I did in anything but a good mood. However, next morning I had the satisfaction of finding my crocodile belly upwards at the bottom of the water a few yards out. He was fished up, and had been hit twice—in the jaw, and by a lucky fluke also in the spine, which was broken.

Before it was time to start in the canoe to pot baskers, I took my rifle and wandered along the reedy banks, intent on killing something. There were birds galore, but nothing for a rifle could I find till I came upon a mound of rotten leaves, the sight of which sent my heart into my mouth. It was the first crocodile's nest I had ever seen, and I knew the owner was not far off, lying in watch for intruders. I pitched stones about in every direction, but did not move in the thick reeds, having no fancy to be taken by the leg. At last, a slight movement in the rushes at my side betrayed the presence of the lady. There she was, a few yards off, with one wicked eye fixed unfearingly on me. I moved quietly round till I could see the other; then, taking careful aim between them, relieved her of her brains.

That morning we had good sport. Paddling quietly along the banks we came across some monsters. Though numerous, they were very wary, and, while apparently asleep, at the slightest sound glided into the water and disappeared. However, we got some good shots, the best being at one that was crawling out of the water on to a bank, and which I shot through the head as he was half in and half out, and just as he spotted us.

In shooting on tidal waters it is essential to kill dead, as otherwise the beast will scramble into the water, sink, then be carried away and lost. A dead crocodile rises to the surface after about fifteen to twenty hours, but by that time is not a pleasant object to approach. Speaking of the keeping propensities of the tribe reminds me of a young subaltern, newly quartered in Colombo, who was very anxious to shoot his first crocodile. He returned one day in a state of high excitement, with a reptile in a state of still higher condition. It had been shot ten hours before, and he could get nobody to take it to the local taxidermist, one Lazarus. Ultimately, by the help of the all-powerful rupee, a man was induced to take it in his rickshaw, which he did, with its tail tied to its head like a whiting. What the good Lazarus said when it arrived I never heard, but he skinned and set it up, and, after all, our young friend had not yet shot his first crocodile—it was a harmless iguana!—*Shooting Times and British Sportsman*, June 15.

BLACK PEPPER (PIPER NIGRUM.)

This does not get the attention in Assam and its sub-districts of Cachar and Sylhet as it ought to. I don't know what amount of this spice is annually imported into Assam, but it must be enormous. Everybody uses it, from the highest to the lowest. Assam used to be, in former years, a very large producer and now it is only found in *barris* here and there up and down the country. We have a variety of it growing in South Sylhet, but it must be the Bengal variety, as it does not compare in either pungency or flavour with the true Assam plant. So much is this the case that I am inclined to think that it is an entirely different species. The Bengal species has got into Upper Assam too and the real old original Assam Black Pepper plant is exceedingly rare, and anyone who has once used it will never think of using any other that the writer is acquainted with. This plant should not only be better known commercially, but from a botanical point of view it is well worthy of the closest attention. I don't know whether the pepper growers of Malabar or Sumatra are aware that Piper Nigrum is a diœcious plant, but Marsden never mentions it being so in his "History of Sumatra," and it does not appear to have been generally known in Roxburgh's time. But there is every reason to think that this plant, like many thousands more, is in its transitory stage, and little if any perceptible change in such a plant will take place in the comparatively short period of one hundred years. So we may conclude that the plant occurs in some instances in a complete diœcious state, sometimes in the monœcious and probably most often in the hermaphrodite condition. When these circumstances are taken into consideration the intending planter of Black Pepper will do well to bear in mind that he has more chance of having a good well developed crop of corns when he plants his vines three or four together round their supporting tree. Coffee and pepper are eminently adapted for growing with each other, because the shade trees can be utilised for the vines. Such I believe is the common practice in Southern India. I tried Vanilla upon our shade trees, but it would not answer owing to the difficulty in fertilising them. The pepper of course presents no such difficulty, as it is capable of fertilising itself. We have no less than three species which we are going to try and cross fertilise in order to get a bigger corn, at the same time retaining the far-famed Assam flavour and pungency.—*South Sylhet Notes*, June 22.

FISHING IN NEW GUINEA.

BY CHARLES PROTHEROE.

The methods of fishing in different parts of the South Sea Islands are manifold, and some of them would surprise the disciples of Izaak Walton. One of the most ingenious may be laid claim to by the natives of a portion of British New Guinea, namely, Dawson Straits. Here, the web

of a spider made use of in conjunction with a kite affords a novel and successful method of fish catching.

On first visiting these islands, and seeing the natives kite flying, I thought I had dropped among them whilst at play. I was mistaken, for upon investigation I found they were engaged in fishing.

On shore many of the trees are covered with cobwebs, spun by huge spiders. The kite is made of the dry leaves of the sago palm, stitched together and ribbed. It is furnished with two wings, and when flying looks not unlike a good-sized bat. To this is attached a long tail, having, at the extreme end, cobweb gathered from the trees and rolled into a ball. The native paddles out in his canoe against the wind, his kite made fast to the canoe, and flying behind him. The craft, being propelled gently, keeps the kite flying at a certain altitude, and the ball of cobweb, fast to the tail, is kept bobbing on the water. The fish common in these waters, a long narrow kind, not unlike barracouta, or like our garfish, but much bigger, and often two or three feet long, jump at anything moving. They no doubt take the cobweb for a flying-fish, and getting their teeth into it are unable to withdraw them, and so fall an easy prey. The native then pulls in the kite and fish together. As the fish are plentiful, and seldom miss anything they jump at, a few hours of this sport well repays the native for his labour.

About thirty miles from Dawson Straits the natives make use of the cobweb in another kind of fishing, and catch flying-fish during certain months of the year—from December to March, which is the calm season of the year, as you know. Coconuts grow in bunches, and, after they are plucked, the pliant, tough, elastic stem, with perhaps twenty or thirty shoots along it on which the nuts once grew, is brought into use. A lot of these stems are covered with cobweb, and thrust into long narrow baskets made out of the coconut leaf. A long line is made fast to the basket, and after paddling perhaps a mile or so from the land the basket is thrown out, and allowed to drift astern. The flying-fish, to escape from their voracious enemies, which are numerous, seek refuge in these baskets, and, once in, the cobweb effectually prevents them from coming out again. The basket as it gets wet sinks just below the surface of the water; then, after it has been out some time, the native pulls it in, empties the contents, and then repeats this operation. The craft most used in this part for flying-fish catching is the catamaran, just three logs of cedar, roughly shaped and lashed together, and cut away underneath at the ends, to cause less resistance on being driven through the water. You may meet them three or four miles from the shore when engaged in this occupation, lazily floating, and going with the tide.

This sort of fishing appeals to the native mind, for there is no real work about it, the only exertion required being to haul the basket in from time to time. He is a keen trader, and is always willing to do a deal with you for his flying-fish, which are excellent eating. The size of the fish range from a few inches to a foot; the biggest one I ever saw was little short of two feet long. Their lot is not, I should think, a very happy one, the big fish driving them up from below, and a flock of sea-birds waiting to pounce upon them as soon as they show above the surface. The larger fish give them no rest, and you can tell the course they are taking by the birds which hover about and follow them for miles. The flying-fish use their wings when startled or in danger, which indeed seems to be their chronic state in the day time. Their flight is limited to six or seven hundred yards, for, as soon as their wings dry, the fish drop into the water again, and do not continue their flight unless compelled to. The picture shows a party of New Guinea men net-fishing. The way the natives keep their equilibrium, standing upright on the catamaran, is an acrobatic feat only to be attained by practice. The confident manner in which they move about on their primitive craft gives one the impression that it is easy. I thought so myself until I tried it, but was glad to drop gingerly on to my hands and knees until I came within reach of something more solid, which in this instance took the shape of a thirty-ton cutter. When engaged in fishing each catamaran carries two men and a pile of netting. This is shot and laid out on the water in the form of a horseshoe. Two catamarans are then paddled up the centre of this net, the natives on them beating the water with long poles, and making a violent noise so as to frighten the fish into their net.

The mode of fishing in favour with the white people in New Guinea, when they do not use the ordinary baited hook and line, is quicker and more simple than any of the native methods. At the same time it is more brutal and destructive, and the man who makes use of it without absolute necessity should be looked upon in the same light as a sportsman would regard a person who shot at a sitting bird. When a shoal of fish is sighted in shore they go out in a dinghy, or small boat, the fisherman having a fire-stick in one hand and a charge of dynamite in the other. Shepherding the fish round for a time until he gets them in a favourable position, he touches the fuse that is inserted in the dynamite with his fire-stick and throws it in the midst of the shoal. The fish, instead of taking fright at the splash caused by the cartridge falling among them, rush towards it. A dull explosion follows, and hundreds of fish rise to the surface, but quickly sink again. Some people believe that dynamited fish float on the water, but such is not the case; the shock having stunned them, and burst their swimming bladders, they immediately find the bottom. The natives then dive and pick the fish up with both hands, the dynamiter having taken care that they were not in more than three or four fathoms of water when the charge was thrown among them. I fired a charge one day, and the boys (natives) had gone down in this usual manner to pick the fish up. Looking over the side of the boat I was horrified to see five or six large sharks quietly picking up the fish on their own account, and taking not the slightest notice of the boys, who were close enough to have touched them with their hands. The immunity enjoyed by the natives in this respect is remarkable. They are constantly in the water, but for one of them to be attacked, or bitten by a shark, is almost an unheard-of occurrence. This is explained, I think, by the fact that the island shark finds plenty of food in the fish which abound, and so is never very hungry. A white person, however, does not enjoy the same immunity as the native, perhaps because the colour of his skin is more attractive. The mid-ocean shark, on the contrary, will tackle anything, and is no respecter of persons, black or white.

Having to travel a long way for what food he picks up he is always in a savage state of hunger, and I doubt if it is ever fully satisfied.

The native simply delights in dynamite-fishing. The noise, the splash, and the result all appeal to him, and give him the idea that they are just what they should be. He would give anything to possess the explosive, but fortunately a wise and paternal government has stepped in, and made it a punishable offence to supply natives with fire-arms or explosives. The man who is foolish enough to furnish them with the means of blowing up themselves or their friends will find himself liable to a fine of a hundred pounds. A spice of danger about dynamite-fishing is perhaps answerable to some extent for its use. With the trader dynamite is looked upon as an essential part of his outfit, and he would almost as soon think of leaving port without a mainmast as start on a cruise without a supply.

Familiarity breeds contempt. In the handling of dynamite it generates carelessness. The man who understands it, and has used it frequently, is usually caught in the end, and the old saw of the pitcher that goes often to the well is fully justified. One could hardly imagine a man throwing away the fire-stick and retaining the cartridge in his hand. Yet that is what one man I know did, in his excitement and absent-mindedness, with the result of losing his arm; and had not a friend been on the spot with surgical knowledge enough to amputate the limb above the elbow, he must have lost his life. As it is, he adds one more to the long list of one-armed and one-handed men in the islands, maimed through the careless use of dynamite. I was once lying at a place called 'Senapa,' on the north-east coast of New Guinea. A small trading-vessel called in one day, and the trader after the usual fashion started fishing. Putting half a dozen cartridges down, and turning his back for a moment, the natives, who were expert thieves, purloined one of them. It was impossible to recover it from among such a crowd, so my friend sailed away and left it in their hands. I came back to the place some few days after, and then I heard what had happened. The man who had stolen the cartridge, when the coast was clear, invited his friends to come and witness him dynamite fish in the same manner as the white man. Poor fellow! he didn't know much about the article he was handling, and it is certain he never will. The dynamite was a double charge; it was two days since he had given his exhibition, and they hadn't found all of him then. After witnessing many accidents, dynamite strikes me as being a splendid article—for what it is intended for, that is mining purposes in the hands of experts.

The sort of fishing practised by the native women is mostly done from the beach, or in shallow water. A number of them, each provided with large two-handed nets, will wade out at different points, meeting when up to their armpits in something like a half-circle. The fish, if any remain visible, are then frightend into the nets by the women who remain on shore. As many as fifty will sometimes take part in this kind of fishing, furnishing a most animated scene. The only wonder is that they catch anything at all, for the shouting and laughter that goes on should be sufficient, one would think, to frighten fish that were half a mile away.

Tow-line-fishing is too well known to need much description. When you are sailing, a hook covered with a piece of red and white rag is stowed over the stern with a good length of line, and proves a tempting bait for the king fish. Fifteen to twenty pounds is the average size of this fish, which in appearance is something like a salmon, but white fleshed, and remarkably good eating.

The canoe on the beach is a sailing craft, used by the natives to go from one island to another, and long journeys are undertaken in such boats when used on trading expeditions. The bottom is a large cedar log hollowed out, the flat sides being built up with sago palm slabs, sewn together with cane, and made watertight with a gluey substance extracted from certain trees. A large mat, made of sago leaves, and oval in shape, is hoisted on the mast as a sail, and the way these canoes lie in the wind and travel is nothing short of marvellous. There is a platform for deck, and an outrigger stetching five or six feet out on one side, the outrigger being a light log lashed to two poles that are fastened to the main canoe. This outrigger gives such stability that it is impossible to capsize the boat, and altogether they are a most seaworthy craft. Another good point in them is that when they are required to go in an opposite direction to what you have been sailing there is no need to turn them round. Both ends being alike the native simply slues the sail about, and what was the stern then becomes the bow. Great care is taken of this class of canoe, and some of the carving on the ends is really a work of art. They are also decorated with cowrie shells along the water line, and on the stem and stern posts.—*Badminton Magazine* for July.

ORANGE CULTIVATION IN EGYPT.

There is no doubt but that the cultivation of oranges is a far too neglected branch of horticulture in Egypt, which has been especially recommended by experts as one of the best suited spots for the establishment of a garden for oranges and other fruits of its class. Although much progress has recently been made in its cultivation in this country, there is still room for much greater extension. At present the export of oranges only amounts to about one-eleventh of the import, and, fortunately for those in the orange trade, the fruit comes in at the same time of the year as the annual influx of visitors, much to their mutual satisfaction. The "Yussuf Effendi" is the variety most extensively grown here. These are mostly sold locally or at neighbouring large towns at a fair price. Although a nicely-flavoured and satisfactory fruit it has been cultivated too exclusively. The smaller variety, sold in England as Tangerines, fetch about the same price as the best Jaffas. They should prove very remunerative to growers here for export. Belonging to the same loose-skinned group are the "Nagpore" of Bombay and "Sylhet" of Calcutta. Both of these are grown very largely in India and are very much alike. The "Nagpore" tree is a spreading variety while the "Sylhet" is an upright tree, grows higher, and is only grown from seed. Both are excellent varieties for exportation. Two other varieties which should do well here are the "Suntolah" and the "Keonla." The former orange is very small but extremely sweet. It grows almost wild in the hot, humid part of India between the Himalayas and the Ganges. It should be suitable for those parts of Egypt or the Soudan which have a similar climate but should, of course, be tried in any part which can be kept well supplied with water throughout the year. Naturally, it requires very little attention. As novelties are always acceptable in English markets

and as it is sweet almost before it is quite yellow, it promises well. The "Keonla," another Indian orange, is to be greatly recommended on account of its lateness. On comparing one of these trees with the "Yussf Effendi" one would imagine that, as both oranges were of the same hue and size, they would both be ripe. This, however, is not so. Long after the other oranges have been gathered the "Keonla" stays on the tree until at last its colour is a beautiful dark red, and not till then is sweet. Of course, in Egypt, this should be ready for gathering just as the "Yussuf Effendi" is over and when the "Portugal" is dearest, at about the end of April. Many other varieties of the Suntara group, grown in India, Ceylon, South China, and East Indies, and Australasia, might be tried. The Australians have for two or three years been sending oranges to England. They are mostly of the Portugal variety and have reddish skins. This is, of course, rather an attraction, and so they sell at about two or three times the price of the ordinary ones. Considering that it takes three times as long for ships to reach England from Australia than from Egypt, this should greatly encourage growers here.

Belonging to the Portugal group there are many kinds which ought to be grown here with great success. Already Egypt has successfully reproduced the blood orange from seed—a feat apparently as yet unaccomplished in any other country. Other varieties have been grown well in private gardens. There should, therefore, be a great extension in the growth of the seedless egg-shaped orange of Malta, the Jaffa seedless varieties, and the "Bisray," which is grown from seed, and is one of the best of Jaffa oranges, All of these are too well known to need description. The great advantage of this class of orange is its keeping qualities. With careful packing it will keep for two or even three months. The British Chamber of Commerce in Egypt reports that the egg orange has been introduced into Florida and has been so successfully cultivated that it is probably now more extensively planted there than any other kind. In Malta there is said to be also a unique orange of the same group which is never sour from beginning to end but sweet and juicy, It is there called "Loomi Larenj." Such an orange should be well worth cultivating and should always command a good price. Another orange sold in Bombay, the "Mussembi," is brought from Poona, and it is said that it can be kept on the trees for a whole year without deteriorating. The Chamber of Commerce rightly complain that the "Lemoun Hindi," often exhibited at our horticultural shows, is not properly cultivated. To obtain a really delicious fruit the trees must have, as nearly as possible, conditions of soil, heat, and humidity similar to what they have in the island of Labuan and at Amoy, where they grow to perfection.

As regards the treatment of the orange tree, practical experience, combined with logical reasoning, is of far more value than theoretical book information. Nevertheless, it is both interesting and very useful to read of the results of others' experiments and work, and to profit by their successes and failures. The number of trees per feddan should be, to obtain the best results, one hundred. At Jaffa, however, as many as six hundred per feddan are generally to be found. Abundance of irrigaton water is the *sine qua non* of a plantation and the watering should be done continually. The fruit consisting of over 90 per cent water, it will be understood that without a sufficient supply the tree cannot possibly do well. The average of several analyses of the orange shews that there are four parts each of nitrogen, phosphoric acid, and potash per thousand. Calculating from this, 1,000 kilos of oranges will contain 4 kilos of each of these three constituents. Growers generally fail to supply this amount again to the soil, and consequently it gets weaker and the produce of oranges less. To obtain theoretically this amount each of the trees supplying the thousand kilos of fruit should receive 2½, 2½, and ¾ kilos respectively of nitrate of soda, superphosphate of lime, and sulphate of potash in return, besides an additional quantity for their growth of wood and leaves. Manure is one of the absolute necessities of the orange tree if it is to produce well. Every piastre properly expended in well manuring the trees brings much over a piastre's worth of extra fruit, either numerically or in size, besides giving a better flavour to it. The soil of Egypt is admirably suited to the physical requirements of the orange tree. A perfect soil is a mixture of sand and a little clay and lime. The lightness of this soil allows the water to sink in easily and the roots to spread out well. Now, if there be added to this good food for the tree, it can of course do well. The Nile mud, like the "loess" of China, is a typical fertiliser. But growers must remember that where the deposit is thin or absent, cultivation cannot be carried on profitably without abundance of artificial manures. Speaking in a simple way, nitrogen produces wood and leaves, phosphates produce fecundity, and potash produces sweetness and flavour. Lime is absolutely necessary for the orange tree, which absorbs great quantities of it. If not present in the soil it should be supplied in the form of Gypsum. If too abundant the sap will not run freely, but ⅓ kilo of sulphate of iron for each thousand kilos of fruit produced will correct it. The Gypsum and iron sulphate also help to fix the fruit on the tree. Seeds should not be treated with mineral fertilisers but should be given plenty of organic food. Stable refuse is excellent for the seed beds, but it should be passed through a very course sieve and the big straws taken away. Most people in Egypt make the mistake of digging holes round their trees and filling these with water. Instead of a hole, in the middle of which stands the tree, a ring should be made so that neither fertiliser nor water will touch the trunk. One very successful orchard owner bores holes in the ground in a circle round the tree varying in size, depth, and distance from the stem according to the size of the trees. These he frequently fills with liquid fertilisers so that the roots thus receive a greater benefit and the tree can better keep its upright position. The best time to apply the manures is about a month after the gathering of the crop and again when the fruit is about half-grown. Thus the first part will strengthen the tree for producing the fruit and the other part will supply the nourishment for the fruit when growing.

Lemons, limes, citrons, and other trees of the Citrus group require almost the same treatment. The lemon and citron need more nitrogenous manures than the orange to the extent of about 12 per cent. and the other sour fruits of about 10 per cent. Lemons in this country are smaller but more juicy than others and limes are very inferior. Both would repay generously more liberal feeding. A few only of the best and most suitable kinds of oranges have been named. There are many others which might be grown to advantage. Young trees and picked seeds can generally be obtained from the nurserymen and horticulturist in the different countries. Those who are anxious to obtain them would no doubt be able to get information and help from their respective Consuls. It is to be hoped that orange growers will take "Excelsior" as their motto and that we shall soon see a great development in the orange trade. With a little experimenting and care, many new varieties should be well established and both quantity and quality improved, Those who prefer to keep to their present variety should at any rate spend a little on improving it. One thing is certain, any expenditure the growers may make in doing either or both will prove a good investment.—*Egyptian Gazette*, July 1.

RUSSIAN TEA.

A PRINCE'S ENTERPRISE ON THE BLACK SEA.

It is not generally known that Russia—next to England the greatest tea-drinking country

in Europe—is making great efforts to grow a portion of her own tea in Russia. Along the eastern shore of the Black Sea, a district favoured with a suitable soil and climate, a number of Russian landowners, at their head Prince Voronzoff, have begun tea-planting on a considerable scale, and the result of their efforts encourages them to persevere. One planter has about 40,000 acres which he is carefully preparing for tea culture. This year's harvest promises to be about six tons, but each year, as the plants grow older, the harvests will increase. On Prince Voronzoff's estate it is expected that next year a harvest of twenty-five tons will be gathered. These are only small beginnings, but it has now been proved that tea will grow in that favoured locality, and that its growth will pay. The quality of the tea grown on the Black Sea coasts is said to be of the purest.—M. A. M. —*Leisure Hour*, (July.)

THE M. P.'S ORCHID.

"Odontoglossum crispum var Triomphe de Rambouillet." This is the name of an orchid for which Mr J Rutherford, M P for the Darwen division of Lancashire, paid the Land Horticole Coloniale of Brussels £80 in November 1899. According to the diagram supplied by the sellers the flower had a pinkish ground, dark red marks and spots, and a pure white lip. Instead of this, when the plant flowered in 1900 it had, said Mr Rutherford, a muddy yellow ground with brown spots. Yesterday Mr Rutherford sued the Land Horticole Coloniale to recover damages for breach of warranty in regard to the sale. The defendants admitted the warranty, but contended that a genuine Rambouillet had been sent and that Mr Rutherford must have got his orchids mixed. John Lupton, Mr Rutherford's gardener, said that, had this orchid blossomed as represented, it would have been worth £150. As it actually bloomed it was worth something under £5. The case was adjourned.—*Daily Mail*, July 3.

CINCHONA PLANTATIONS IN BURMAH.

It would be interesting to learn what has become of the cinchona plantations spoken of in 1880 as existing in the Toungoo district by Major Spearman in his Gazetteer. In December 1868 a small plantation way commenced on Plo'o-ma-do hill, south-east of Toungoos at an elevation of 2,100 feet. One hundred and eighty plants of the "Succirubra," or red bark variety, were planted, of which 128 were living twelve years afterwards. Two plants of the same species planted on Bogale hill at an altitude of 2,800 feet, but in rather an exposed situation, had attained a height of nine and ten feet in thirteen years. A plantation was formed in 1871-2 at Thandaung, eighteen miles east of Toungoo, at an elevation of 3,700 feet. The red bark variety is the only one of the different species tried which has succeeded at all. Plants of this species, though vigorous enough, have a bushy and gnarled appearance, and were covered with seed though only about ten to fifteen feet high. The other variety, planted over two-thirds of the whole area of 100 acres, failed. The plants grew well for two or three years but then began to sicken and die. Plants were gratuitously distributed to heads of Christian Missions. We have not noticed in any Forest Department report any account of these cinchona plantations, the oldest of which were planted from thirty to thirty-five years ago. It would be interesting to learn what has become of them.—*Rangoon Gazette*, July 15.

SISAL HEMP INDUSTRY.

Dr. Morris [in a letter dated Barbados, January 28th] has estimated that under favourable conditions the cost of cultivating and extracting the fibre should not exceed about £10 or £12 per ton. The market price, however, is very variable. It has been as low as about £13 per ton; on the other hand, it has, for one or two years continuously, been as high as £30 to £40 per ton, or even higher. The plant will undoubtedly grow in Trinidad and Tobago. There are already a large number of plants running wild in the latter island. It is to be remembered that it is not a cultivation for small proprietors. It is carried on on very much the same lines as cane cultivation. I estimate that it requires a capital of about £7,000 to £10,000 to start and maintain a plantation, say, of 1,000 acres in regular working. Anything less than the area above given would not keep the scutching machines in full working, and thus add to the cost of management and the up-keep of the plantations. As only about three per cent of the weight of leaves is returned in fibre, there is a heavy cartage of these to the factory. On an estate turning out, say, 500 tons of fibre, not less than about 15,000 tons of leaves have to be brought to the mill. This necessarily involves considerable expenditure in carts and stock, or in estate tramways. It is stated that in very rich soils the fibre is not so strong and abundant as in comparatively poor soils in dry climates. Again, in the Bahamas, it was found that absolutely barren land was quite useless and led to disappointment and loss.—*Proceedings of the Jamaica Agricultural Society*.

TOBACCO GROWING IN NORTH NEW ZEALAND.

Mr. G F Sutherland, of Fiji, who was commissioned by the Government of New Zealand to report upon the suitability of the North Island for growing tobacco as a commercial crop, has just sent in his report. Mr. Sutherland has had 23 years' experience as a tobàcco-grower in India, Australia, and Fiji. He has on the present occasion visited the whole of the North Island, and we understand that his report is generally of a favourable character. He deals with the questions of soil, climate, economic conditions, former experiments, and the reasons why they failed. Mr. Sutherland leaves on the 26th inst. for Fiji.—*Auckland News*, June 21.

TEA IN MAURITIUS.—According to a report recently received at the Colonial Office from the Government of Mauritius and Rodriguez, there are four factories of tea in that colony and several plantations, covering approximately 200 acres. The tea made is nearly all consumed in the colony. In 1898 there were five factories and 367 acres under cultivation. The average selling price in 1898 and 1899 was R1·20 per kilo. The approximate quantity manufactured in 1899 was 27,000 kilos., of which only 2,585 were exported, chiefly to the United Kingdom. In 1898 it was 40,000 kilos., of which 7,266 kilos. were exported, chiefly to Madagascar. The year 1899 shows an approximate decrease of 13,000 kilos.—*Tea* (May.)

THE PROPOSED TEA GROWERS' ASSOCIATION.

[*To the Editor*, HOME AND COLONIAL MAIL.]

Sir,—As a private proprietor in Ceylon, I am more than pleased to see Mr Sholto G D Skrine's resolution at the meeting this last week of the Ceylon Association in London to form a "Tea Growers' Association," and if it is to be a success we must get India to join us and look to the support of all the large companies in India and Ceylon: the smaller proprietors, I am sure, will follow. I am plucking finer this year and throwing away all leaf three rounds at least after pruning. What has it benefited me up to date? A yield of 3,500lb less tea and lower price per lb. It is no good to say that some of the "tea companies" have done well, and therefore they cannot join a "Tea Growers' Association," or some such scheme of this sort. The small proprietors might equally say the same. No, we must all help one another by joining in some such scheme as this for the common good, and the sooner the better.—Yours faithfully,

CHARLES E. G HATHERELL.

Radford House, near Leamington.

July 1, 1901.

—*H and C Mail*, July 5.

COCONUTS AND TAPIOCA IN PAHANG, STRAITS.

In the Pekan districts 3,000 acres of land on the coast have been alienated to a Syndicate (for planting coconuts, I understand), of which about 500 acres have been cleared and are being fenced. A block of another 2,000 acres, alienated for tapioca cultivation, will probably revert to the Government, no work having been begun on the block.—*Official Report, 1901.*

PRODUCE, PLANTING AND COMMERCIAL NOTES.

Although the tea industry is under a cloud, which we hope is but temporary, the attendance at the Annual Assam Dinner last week was remarkably good, nor were there any marked signs of depression observable in the tone of the speeches. These festive gatherings are of ancient standing now. The first took place in 1883, and since then death has claimed some of those who were wont to be so regular in their attendance. It seems long, although it is but really only a short time, since the late Mr John Berry White was a conspicuous figure at these gatherings, of which he was one of the chief founders, and his cheery "Hear, hear," when one or another of the speakers referred to the old Assam days or touched a chord of memory, still ring in one's ears. But although several of the veterans no longer grace the festive board, the attendance does not diminish, and the chairman of last Thursday was as full of eloquence and enthusiasm as in the good old days when tea was higher by some pence per lb. If some of the old familiar faces were absent those present were fairly representative of all departments of the industry, and the dinner was a great success. We trust that when next Assam planters meet to dine the outlook for tea will be brighter. A special feature of this occasion was the presence of Lieutenant-Colonel D M Lumsden, of Lumsden's Horse, who, needless to say, received a very hearty welcome.

Commenting upon the position of the tea market in the Dominion, the "Canadian Grocer" says;—"Japan teas are in a somewhat unique position at present, they being strong in price, while those of other countries are weak. The chief factor in this is the buying on United States account. If the present high price of Japan tea is maintained, benefit will certainly accrue to Ceylon greens."

America took considerably more Indian and Ceylon tea in the first three months of 1901 than during the corresponding period last year—5,112,871 lb., against 4,043,062 lb., an increase of 1,069,809 lb. As the main increase was received from London, there is no doubt, say Messrs. Gow, Wilson and Stanton, in their last report, that low prices have been the cause, and the expansion has therefore been in black tea. To capture the North American market for green, unfermented, and Oolong teas is more important, say they, than ever. There seems no reason why this should not be done, now that absolute necessity demands it and it has been proved that suitable tea can be made.

In view of the fluctuating fortunes, in the past ten years, of the Assam Frontier Tea Company, the directors are no doubt acting prudently in the policy they will recommend to their shareholders for adoption at the coming meeting. The available surplus for the year 1900, after providing for the six per cent. dividend on the Preference shares, is equal to a distribution of 7 per cent. on the Ordinary; but they propose to pay 3 per cent. thereon, and to devote £4,454 in part payment of the upkeep of recent new extensions, leaving £1,229 to be carried forward, as against £2,873. Last year the Ordinary shares got 8 per cent., previous dividends having been (reading backwards) 4, nil, 6, 6, 3, nil, 2½, 7½ and 11, this last being for the company's first year —*Home and Colonial Mail.*

Railway Enterprise in Ecuador.—Our, Guayaquil Correspondent writes under date May. 13:—"The extension of the Railway from Guayaquil to Chimbo and the capital of Eucador has made some substantial progress in the course of the past year. A large quantity of rails and other material for the construction of the line has recently been received. Some 25 miles of earthworks have been built, and over the first half-dozen miles the track is now laid. The remaining portion of about 100 miles, however, presents greater difficulties than any hitherto encountered by the contractors. Before Quito is reached many steep valleys must be crossed, and innumerable rivers and streams bridged. The construction will be costly and calls for engineering skill of no mean order to carry the undertaking to a successful issue. While the line may prove to be a benefit to Ecuador from a political point of view, inasmuch as it will give easy access to the national capital from the seaboard, the commercial prospects of the undertaking are not brilliant. The city of Quito contains 1800 inhabited houses and 40,000 may, therefore, be regarded as a most liberal estimate for the population. The route followed by the line traverses no thickly settled districts, nor does it tap a country where the natural resources promise any great future development for mining or agricultural industry. The climate throughout the regions lying between Chimbo and Quito is totally unfitted for the settlement of immigrants from Europe. In the vicinity of Quito there is little production of any kind, except of such foodstuffs as are required to meet the demand of the local markets. In these circumstances it is impossible to see where the traffic is to be obtained to support the railway on any satisfactory commercial basis. Unfortunately it is British capital, largely subscribed in Glasgow, that has been invited in this enterprise.—London *Times.* June 17.

PLANTING IN JOHORE.

The following information respecting the State of Johore has recently been received from the Corresponding Agent of the Imperial Institute, the Hon. Dato James Meldrum, F. R. G. S. :—

The cultivation of gambier is beginning to languish, owing to tho distauce planters require to go from the water before they can find virgin forest and fresh land for new plantations. This industry is entirely in the hands of Chinese. The destruction of valuable forest trees is to be regretted—thousands of acres have been cut down by gambier planters, who, when the soil is exhausted, seek for "fresh fields and pastures new." Some have gone to Raja Brooke's territory, Sarawak; some have gone to British North Borneo.

The cultivation of tea has practically ceased, owing to want of cheap labour; otherwise, the frequent rains and heat are favourable for leaf crops.

A new steam saw-mill has been erected by Chinese assi ted by Johore officials. The Johore Steam Saw mills, erected in 1866, are in full work; supplies are now brought from greater distances. Ballow, sometimes called Johore teak, has become scarce; this wood was admitted by Lloyd's for "all parts in ships of the highest grade"; it is harder and heavier than *Tectona grandis*, and nearly double the strength.

No planting of gutta percha trees has been attempted; the supply cannot be kept up much longer. As regards forest trees, there are no private individuals in Johore to undertake such planting; indeed it is only Government who can perform this important duty.—*London and China Express*, July 5.

THE MANURIAL RELATIONS OF THE BOIS IMMORTELLE AND CACAO TREES.

With reference to the Analysis of Bois Immortelle Flowers made in the Government Laboratory, and recently published by command of H.E. the Governor as a Council Paper (No. 38 of 1901), we quote as follows: I have the honour to add for the information of the Agricultural Society that these flowers appear to supply all the Nitrogen *permanently* removed from the soil by the cacao beans. And in support of this I submit the following figures:—

	Nitrogen per acre.
250 Cacao Trees—500 lb cured cocoa containing $2\frac{1}{2}$ per cent of Nitrogen	$12\frac{1}{2}$ lb
50 Immortelle—500 lb *dry* flowers containing (say) 4% of Nitrogen	20 lb

In making this estimate, I have allowed for a full yield of cacao; and I believe I have not overestimated the yield of Flowers.

The Flowers lose their Nitrogen rapidly as the following results show:—

	Nitrogen %
1st Analysis (fresh flowers) ..	6·32
2nd do (2 days old) ..	5·16
3rd do (5 days old) ...	4·14

I recommend the attention of cacao cultivators to these results which appear to me to be of considerable importance.

BOIS IMMORTELLE AND OTHER FLOWERS, MANURIAL VALUE OF.

Source of Flowers	% of Nitrogen in dry Flowers.	
Saman fresh	4·40	
Do same sample older ..	3·55	
Poui	4·55	
Sugar Cane (old flowers) ..	1·43	
Hibiscus	2·71	
Water Lily	4·68	
Immortelle (anauca) from Tacarigua	6·30	fresh flowers
Do same sample older	4·05	
Do do ..	3·96	
Do from Tortuga ...	6·32	fresh flowers
Do same sample 2 days later	5·16	
Do do 5 do	4·14	
Do do 6 do	3·91	
Do from Botanic Gardens	4·21	fresh flowers
Do do Cascade Valley	4·81	do
Do do Caroni ..	3·25	do
Immortelle (Bocare) from Cunipia	4·93	(2 or 3 d'ys old)
Do do Caroni	3·84	fresh flowers
Immortelle leaves	2·87	
Locust Beans (from Saman tree)	3·07	

P. CARMODY, Government Analyst, Trinidad, 14th March, 1901.

BRAZIL AND OVERPRODUCTION OF COFFEE.

THE LABOUR SUPPLY—RAILWAYS—GOVERNMENT PAPER—FOOD SUPPLIES—THE RUBBER INDUSTRY—SUGAR AND RUM—COTTON AND WEAVING—AMERICAN FARMERS—GERMAN SETTLERS—ITALIAN LABOUR—BRAZILIAN EXCHANGE—PURCHASING POWER OF THE MILREIS.

Great changes have taken place in Brazil during the past twenty-five years. The coffee crop has doubled in quantity and improved in quality. Many of the coffee planters of Brazil have put up improved machinery and take great pains to cure their coffee properly and endeavour to improve prices. The great difficulty is that a large number of the planters still harvest their crops in a slip-shod manner, stripping off the green coffee with the matured berries, and leave the cherry too long on the ground before raking it up and sifting the coffee from the rubbish. The consequence is that, however much trouble and extra expense the leading coffee planters take to improve their prices, the small farmers undo all by their slovenly work and, instead of improved prices, Brazilian coffee still bears a bad reputation and the middlemen make capital out of the producer's want of co-operation and want of system in preparing their coffee crops for the markets of the world.

Attractive labels are printed for the grocers, calling the ordinary Santos and Rio Coffee "Old Java" or rather "*Old Government Java and Mocha*" and the conservative old ladies in all parts of the world still believe they are using the genuine article and get quite angry if anything but "*Old Government Java and Mocha Coffee*" is offered to them.

The origin of the brand "Old Government Java" was, I believe, brought about by the Java Dutch Government leasing land to the farmers of Java on condition that the coffee crop was sold to them.

The Dutch would in all probability receive the bulk of such coffee and, after Amsterdam and Rotterdam were served, there would be very little left for the United Kingdom, Canada, and the United States of America.

Then again the Brazilian planters call their pea-berry "Mocha" and it is duly shipped from Santos and Rio de Janeiro as Mocha coffee!

"What's in a name? The rose by any other name would smell as sweet," and *so does Indian and China tea when labelled Ceylon!*

The overproduction of tea is a very serious thing and so is the over-production of coffee. Will the cheapness of coffee as compared with tea lead to the return of some of your tea-drinkers to coffee?

Will the wholesale adulteration of coffee still continue when Brazil has despatched her twelve millions of sacks or fifteen millions of hundredweight ?

I remember a nice old German coffee-dealer in Canada who was one day very busy mixing roasted barley with his coffee. The perfume was delicious, and he looked up with a grim smile and said, "It is goot for dare stomacs. When I give dem pure coffee, day say it give dem de headache and now day say my coffee is de best day ever drink it."

There will be plenty of Brazilian coffee with the addition of chicory, beans, and barley, converted into fine "old Government Java and Mocha."

It was thought that, when the slaves of Brazil were withdrawn from cotton and sugar culture and concentrated on coffee growing in Brazil, the coffee crops would reach their zenith and diminish with the dying out of the two-and-a-half million of slaves ; but this is not the case, for the Brazilian Government imported European labourers from Germany, Austria, Spain, and Italy ; hence the large area planted by the poor slaves, who have disappeared from the face of the earth, is now harvested at great expense by Italians and Spaniards.

I have no sympathy with the latter race who rose to grandeur by slavery in South and Central America and now substitute themselves in the place of the dead and departed slave in Brazil.

Before the railways were made many colonists made a footing in the country by the carrying of coffee, on mules and by bullock-carts, to the shipping ports.

The Germans are small farmers and form snug settlements both inland and on the coast—some are engaged in cattle-farming at Rio Grande de Sul and many keep hotels. The making of the railways employed thousands, many of whom are now well-to-do coffee planters and storekeepers in the numerous Brazilian cities, such as Rio de Janeiro—Santos—San Paulo—Campinas—Rio Claro—San Carlos de Pinhal—Araraquara.—Jabatacabal—and many other thriving townships scattered throughout the coffee district. It is true that, through the rise in the value of the milreis or paper money of Brazil, many colonists take advantage of the cheapness of gold to visit their homes in Europe and therefore labour is very scarce just at the moment when the big crop is coming in with a rush.

Food supplies are much dependent upon the weather; the corn and bean crops are often failures through prolonged droughts in Brazil ; each estate or Fazenda grows corn and beans, manioc and tobacco, between the rows of coffee as well as separate fields ploughed and harrowed for reserve supplies of food.

It is a melancholy fact that in Brazil one travels hundreds of miles through monotonous country without seeing villages or market gardens. Everybody must work for the coffee planter and nobody is allowed any ease or independence in that country where the slaves were locked up at night inside an enclosure by the planter's house and coffee stores .

Out of the coffee region there are rubber collectors who recruit men and make them advances of food and money. The export of rubber from Brazil is very considerable, but they have a wasteful way of harvesting by cutting down the rubber-bearing trees and leaving them to rot on the ground.

Sugar is largely cultivated, chiefly for the making of a cheap rum called "Pinga," largely used by all sorts and conditions of men in Brazil ; it is so cheap that everybody can drink it, sometimes only two millreis per gallon or about four pence per bottle on the estate.

Cotton was once largely exported from Pernambuco and other parts of Brazil and weaving establishments were making money from the ready sale of cloth. At Santa Barbara a number of Americans grew cotton for a mill located in Santa Barbara, but they discontinued growing cotton and cultivated melons. Near Santa Barbara in the Province of Sao Paulo; there is a German Settlement called Limea where a number of pretty fruit gardens and orange and lemon groves may be seen by the traveller journeying from the city of Sao Paulo to Rio Claro, many pretty flower gardens round their neat little cottages bordering the railway track. All the railway stations are crowded with a miscellaneous crew of every nationality under the sun, but chiefly Italians with their wives and numerous families going and coming to and from Italy. The rise in exchange and the cheapness of gold in Brazil is the main cause of so many Italians returning to Italy where they buy a small farm and place some relation in charge of it, then returning to Brazil and taking more contracts to cultivate and harvest coffee on the Fazendas.

The Italian seems to be the only colonist that thrives in Brazil ; he grows grapes and makes his own wine—keeps pigs and goats —grows his own Indian corn and beans—does a little trade in tobacco and rum (Pinga) ; he even receives his regular mail and is well up in the rise or fall of Exchange, discusses the War in South Africa and is a sea lawyer generally, being quite a match for his master, the coffee Planter or Fazendero. The stay-at-home storekeeper is a very different kind of animal ; he likes his pipe of strong tobacco, his pinga, and his dirty cards, does not bother about Exchange, the purchasing power of the milreis not affecting him ; his prices are always the same to his customers, and he laughs and grows fat.

The prosperity of Brazil depends on the labour supply from Italy. HENRY COTTAM.

NEW PRODUCTS IN THE WEST INDIES.

In the course of a lecture before the Royal Colonial Institute on "Impressions of the British West Indies," Mr. Henry de R. Walker, a visitor from England to several of our Colonies (with a view to qualifying himself to speak on Colonial subjects when he goes into Parliament), made the following interesting references to products cultivated in Ceylon :—

The most salient feature (after sugar) is the enormous increase in the cultivation of cocoa * and bananas. Grenada has so largely replaced sugar by cocoa that it no longer grows enough of the former for its own requirements. Dominica, from its physical configuration, should never have placed its confidence in sugar. It was not introduced until the beginning of last century, and has never thriven as well as the coffee for which it was substituted. At present cocoa, limes, and coffee are in the ascendant. Trinidad divides its allegiance between sugar and cocoa ; but, whereas the output of sugar products other than rum

* More properly cacao ; but I have preferred the popular designation.

has fallen during the last fifteen years, that of cocoa has nearly doubled, and two-thirds of the amount goes to Europe. This is an additional proof, if any were needed, that, under fair competition, the British West Indies are able to hold their own. Equal success might be anticipated with fruit if the facilities enjoyed by Jamaica for the transport of perishable produce could be extended to some of the other islands. The Royal Commission recommended, as a start in that direction, that Dominica and St. Vincent should be placed by a subsidised service in direct communication with New York. But the Secretary of State has preferred to persuade the Imperial Parliament to pay £13,500 annually for a connection between the Lesser Antilles, British Guiana, and Canada. The experiment has not been altogether a success; one of the ships was wrecked on the coast of Grenada under circumstances which were the reverse of creditable.

The only other subsidised service, with the exception of the Royal Mail Steam Packet Company, which has been in existence for nearly sixty years, is the direct line between Jamaica and Bristol, which has been inaugurated so recently that its value cannot adequately be determined. Its object is to encourage the growth of fruit in Jamaica, and especially of bananas and oranges. The extent to which the cultivation of bananas has already been carried is an exemplification of the results following from the judicious application of brains and capital. Two extracts will show the transformation undergone by a district in the north of the island.

In 1861, after a personal visit, Trollope wrote that Port Antonio was once a goodly town, and the country round it, the parish of Portland, as fertile as any in the island. But now there is hardly a sugar estate in the whole parish It is given up to the growth of yams and plantains. It has become a provision ground for Negroes, and the palmy days of the town are of course gone.

Twenty-six years later Dr. Morris could write the following glowing report:—At first the fruit was purchased in small quantities from Negro peasants in the neighbourhood of Port Antonio. There was practically no capital invested in the cultivation. The settlers were induced to grow bananas in small patches of an acre or two and to deliver the fruit at the port of shipment. In the aggregate these small patches produced bananas sufficient to fill all the first ships engaged in the trade. The fruit trade in Jamaica is now the means of circulating nearly £500,000 annually amongst all classes of the community, and this large sum is immediately available in establishing other and more permanent industries. Bananas come into bearing at the latest in about fifteen or eighteen months from the time of planting, and, as the return is usually from £10 to £20 per acre, the planter is able, with a comparatively small capital, to establish his land in cocoa, coffee, nutmegs, limes, oranges, and coconuts, which, when the bananas are exhausted, will remain a permanent source of revenue. It is on this account that the fruit trade has always been regarded as capable of building up, little by little, an improved condition for the people, not only of Jamaica, but of other West Indian Islands suitable for the industry. Latterly, many sugar estates have been converted into banana walks, and all sections of the community have taken part in the enterprise.

This vast improvement is entirely due to the Boston (now United) Fruit Company, which, duringthe season, which lasts from March to August, despatches as many as six or eight steamers weekly to Boston, Philadelphia, and New York. And the progress has been well maintained, eight million bunches having been exported in 1899 as against four and a quarter in 1895. When it is considered that each bunch contains more than 100 bananas, some idea may be formed of the magnitude of the trade.

For the present the Bristol to Jamaica line will operate on a much smaller scale than the United Fruit Company; but it is understood that Messrs. Elder, Dempster & Co. are prepared to extend their undertaking as soon as success is assured. We should welcome this scheme, not only because it fosters trade between the Mother Country and a British Colony, but because it affords to that Colony access to a secure market. It is an open secret that Jamaica desired a Reciprocal Treaty with the United States, not so much for the sake of the sugar industry as in order to obviate the danger of a duty upon its bananas. Citrus fruits are heavily taxed in the interests of the growers of California and Florida, and it is feared that a similar fate may befall bananas if Cuba and the Philippines are admitted, similarly with Puerto Rico and Hawaii, into the American commercial union. It is almost superfluous to point out that the present policy of the United States is to impose heavy duties upon all articles which are, or might be, produced within its borders. And in Cuba and Puerto Rico, however it may be in the Philippines, are many districts thoroughly suited to the cultivation of bananas. The new line is, therefore, a most wise form of insurance; nor can Jamaicans grumble at the annual charge of £20,000 when the Imperial Parliament pays an equal amount.

Mr. Walker had much to say about "sugar" and the work of Dr. Morris, and here is a curious paragraph:—

I wish to touch upon a somewhat delicate matter. There is not the cordiality of relationship between the Department and the planters which might be expected in view of its principal aim and object. To this extent its utility is impaired; but, while I sympathise with Dr. Morris and his subordinates, I cannot altogether blame the planters if I am right in seeing herein the cloven hoof of the bounties. They argue, I take it, that an increase in the productivity of the cane might be counterbalanced by higher bounties, and that it could have no effect in improving the credit of the industry, the lack of which is its greatest misfortune, while it might be held to weaken the claim to countervailing duties. In any case, the protected cane-sugar growers of Louisiana are equally able to profit by the work of the Department, and they do not hesitate to do so.

THE AFRICAN ELEPHANT QUITE TAMABLE

(To the Editor of the *Times*.)

Sir,—In several journals I have lately read allusions to the supposed fact that the African elephant cannot be tamed, or, at all events, that all modern attempts to use it in the same way as its Indian relative have failed. I venture to ask the authors of these paragraphs (which appear to have been derived from Belgian authority) to pay a visit to this society's gardens, where they may see every afternoon a full-grown elephant of the African species engaged in carrying women and children up and down the principal parade. So far as the experience of this society goes, the African elephant, if proper measures are taken, is as easily-trained and reduced to obedience as the Indian elephant, although the males of both species, when they attain fully adult age, become, in some instances, liable to occasional fits of ill-temper.

It is desirable that the fact of the African elephant being perfectly tamable should be more widely known, because the belief that the contrary is the case may tend to interfere with the very laudable efforts now being made in several of our African protectorates for the preservation of this noble beast.—Yours, &c.,

P. L. Sclater, F.R.S.

Zoological Society of London, 3, Hanover-square, July 3rd.—London *Times*, July 5.

PRODUCE, PLANTING, AND COMMERCIAL NOTES.

Last week the long threatened movement for establishing private sales of tea in Mincing Lane took practical shape. The object is, of course, the securing of secrecy as to the price paid, and this does not at all suit the retail tea trade. The "Grocer" warns its readers to be very careful in making any purchases of Ceylon tea, otherwise they will probably find that they have been paying the dealers the very large profits that these secret tea auctions are desired to effect, with the result that their tea trade will be seriously damaged.

Referring to these private sales, which opened last week it says: "Last Tuesday the usual public sales of Ceylon tea took place, but the result was more or less a fiasco, as several leading buyers decided to abstain from active operations pending Thursday's private sales, and the greater portion was withdrawn, although the various parcels have been since dealt with privately without material change in values, On Thursday 9,839 packages Ceylon were offered at the private auction, which quantity was sold with fair competition at, on the whole, steady rates, showing no alteration from the public sales of last week. The attendance was very large, many being doubtless present from curiosity. In answer to the question whether buying brokers were to be allowed to circulate their lists of bought-over teas amongst buyers, it was stated that no objection would be raised, and beyond this there was no discussion. Some further private auctions are announced for next week besides the usual public ones, but so far Indian tea has not been included. The success of these private auctions depends on whether all those whom it is intended to benefit are able to see their expectations realised, but it would appear as if the majority of buyers were dubious as to its ultimate good effects. Merchants doubtless expect that by joining this experiment they will get better prices for their teas, but most buyers are keenly alive to the importance of purchasing in the cheapest market, and it is unlikely that an artificial rate of profit can be maintained. It must be refreshing to buying brokers to know that their presence at these sales is tolerated, especially in depressed times, when they have often proved to be the backbone of the market, as other important operators are content for the moment to fill the role of spectators, whilst upon buying brokers the principal burden has fallen of carrying over stock and taking their chance of selling it later with commission only."

At the conference held last week at Brighton of the Federation of Grocers' Associations, Mr. Collis Clark proposed the following resolution on behalf of the Metropolitan Association:—"That in the opinion of this conference the proposals which have recently been made to hold private auctions for tea sales, and so to establish a private tea exchange, is undesirable, and appears to be an attempt to bring about a corner in tea." Mr. Palmer Bryant (London), in seconding the resolution, said he did not think they had anything to fear from the scheme. He believed it would die out very shortly. The resolution was carried, and the Secretary was instructed to forward a copy to the Tea Brokers' Association.

The French Government has again postponed the application of the law of February 24th, 1901, which provided for the imposition of the French maximum tariff on foreign colonial produce. This latest postponement is to February 23rd next.—*H. and C. Mail*, July 12.

THE UNITED STATES TO RAISE THEIR OWN COFFEE.

The United States is a wonderful country and Americans a wonderful people worthy of their origin but there are some things that cannot be done, no even by electricity, and one of them is to grow coffe on the sea. We do not know to a nicety what the area of the American "possessions" suitable for coffee growing may be, but are willing to risk a guess that, even with Cuba thrown in, it would not reach a quarter of what is already under cultivation here. There is, of course, the resource that we refer to in another column of building plantations out on trestles into the sea, but short of that, however anxious Americans may be to raise everything they consume within their own borders, it is impossible just at present. Besides, why be in a hurry? Is it not written that, in the fulness of time, when American markets are surfeited with their own products and the power of the Trusts is waning, Americans will enter on the fulness of the vast inheritance reserved by Monroe and annex South America in a lump with Brazil and her Coffee plantations, all ready made, without any complicated engineering at all? Meanwhile, why alienate the sympathies of a possible possession by so cruelly usurping functions so alien? Let Brazil grow her coffee and sell it to the beneficent protector of South Americans —at a price—and be thankful it is no lower.

No doubt the programme of raising everything you consume is attractive enough to some minds, but, unless it can be completed by consuming all you raise, it has its weak points. It is all very well to assert that, come what may, decrepit Europe must take the States' produce at any price; but, if Europe is to go on buying without selling, she must soon have nothing left to buy with and be bankrupt, when we suppose the U. States would supply everything gratis, out of pure philanthropy. All the same, Brazil has a few advantages in the coffee line that defy competition and will enable her, in the expressive American vernacular, to lick not only the States, but the whole creation. Every time more Revenue is required, or a commercial treaty with this country is involved, pressure is brought to bear and Brazil warned of the awful consequences that obduracy may entail. Its undisguised official origin is sufficient this time to show that, like its predecessors, the present is but another attempt to bluff reluctant Brazil into reciprocity. We can see no use or advantage in so tying our hands. No commercial treaty would prevent Americans from cultivating coffee in their "colonies", if it pays; and, if it doesn't, we require no treaty to give currency to our products in the States; because, if as they are so fond of saying, Europe cannot do without their cereals, the States cannot do without coffee, and in that particular line we boss the show!—*The Brazilian Review*, June 18.

GERMANY AND SPAIN: AND FERNANDO PO.

THE RIGHT OF PRE-EMPTION ACQUIRED.

(London *Times* correspondent.)

Berlin, July 10.

The report of the acquisition by Germany of the right of pre-emption of Fernando Po is confirmed by the *Coloniale Correspondenz*, which states that the agreement in question was made while the former Conservative Ministry of Senor Silvela was still in power. The value of the island, according to the same authority, consists in its cocoa and coffee plantations. These, which at the present moment are about 140 in number, are in the hands of half-breeds, Spaniards, Englishmen, and in some cases Germans. The trade is concentrated in the port of Santa Isabel, and is carried on almost exclusively by Spaniards and Englishmen. The British firms of Holt and the Ambas Bay Trading Company have each an establishment at Santa Isabel, with branch offices on the coast. At present almost all the goods imported

come either from Spain or from England, but it is hoped that German goods will find a market if they are once introduced. A "Fernando Po Committee" is being formed in Berlin for the purpose of promoting German trade and of directing the attention of German manufacturers and merchants to the commercial possibilities of the island.

A BOER PRISONER—EX-JAVA PLANTER —ON COFFEE CULTIVATION.

Sir,—Having, from past experience of tea and coffee planting in Java, always retained a strong interest in these important branches of tropical agriculture—I could not help noticing in your issue of the 16th instant the article, "Wynaad Planting Notes" and the reprint from the *Ceylon Observer* headed "Coffee in Brazil." What struck me more particularly in the first-named article was the reference made therein to a seemingly enthusiastically advocated system of leaving coffee plantations (old ones, I presume) unweeded. "Weedy" gardens must be detrimental to the production of the crop. This at least is my experience both in Java and Sumatra, while during a visit in 1895 to an important coffee-growing district in Mexico I had ample opportunity to see the superiority of weeded over unweeded coffee gardens illustrated, and that under climatological conditions and nature of soil vastly differing from those of Java and Sumatra, Ceylon and, I should say, the Nilgiris as well. In Swazieland (South Africa) I visited a small coffee plantation, started by some enterprising Scotchman (but unfortunately guided by a West Indian planter of limited experience), where the three year-old trees were only fit to be pulled up by the roots, standing in almost a forest of weeds, and black and shrivelled up by the *Hemeleia vastatrix*. Although unacquainted with the state of the coffee industry in India, I should say that the words of the President of the State of San Paulo, as quoted by you from the *Ceylon Observer*, might be studied with advantage by "Herobollollos." To "give no attention to fanciful measures that can effect no real remedy and only make things worse," is sound advice to coffee planters in every part of the world, where the enormous output of the Brazilian article threatens the very existence of the local industry, a danger only to be warded off by studying quality rather than quantity, and which so far has enabled Java coffee planters to maintain their foothold, and prevented their being swamped by the ever-increasing flood of the Santos article. While in charge of the Java exhibit at the World's Columbian Exhibition in Chicago, during 1893, I noticed the strenuous efforts made by the Ceylon Tea Growers' Association for the capture of the American markets, and which I saw repeated at the Brussels Exposition in 1897. The brazen audacity of modern advertising speaks volumes in this revolution of the world's tea markets, which towards the end of the first half of the 19th century was still in the hands of the Chinese and Japanese. Let us hope for the honour of the civilised world's palate that the tea history does not repeat itself in the future of coffee; for in that case we may expect to see some day the Liberia coffee holding the same position in the civilised world over the coffee Arabica which Assam tea holds at present over the Chinese article—and why not, with these respective articles running on almost parallel lines. The Liberia coffee has more body and less flavour than the Arabica, and the same qualities hold good in the case of Assam *versus* Chinese teas. However, Arabica will last our day, and I think that I am expressing the spirit of our times when I exclaim, *Après nous le déluge*! This deluge, however, might arrive a little "too previous" at those plantations which indulge in "weedy gardens,"—*pour revenir a nos moutons*!

J. N. Kalff.

Officers' Quarters,
Boer Prisoners of War Camp, Bellary, 1sth July.—*Madras Mail.*

THE INDIAN TEA TRADE IN 1900.

MR. J. E. O'CONOR'S OFFICIAL REVIEW.

To producers and all concerned in the trade, the year was one of anxiety and depression resulting from the decline of prices to a level much lower than the lowest ever before touched. The statement appended of the prices realised at the public sales in Calcutta illustrates the depth of the descent (annas and pies per pound):

	Or. (& bro or.) pek.	Bro. pek.	Pekoe.	Pek. fans.	Pek. sou.	Bro. sou.	Average.
1895-96..	11-1¼	9	7-3 4/7	6	5-11	5-6 4/5	8-9
1896-97..	9-11⅔	8-7¾	6-9 9/10	5-9½	5-5½	5-3 5/6	8-8
1897-98..	8-9 5/8	7-5 5/7	6 0¾	5	4-10⅞	4-6¾	8-5
1898-99..	8-1 2/5	7	5-8	4-8¾	4-7	4-3 3/7	8-1
1899-1900	7-9 1/10	6-9¾	5-8¾	5-2½	5-0⅓	4-11	8-3
1900-01..	7	6	5	3-11¾	4-1⅔	3-9½	7-11

While prices were falling so heavily, the imposition of the additional duty of 2d a lb in April 1900 on tea imported into the United Kingdom also filled the minds of producers with dread that the additional cost to the consumer would have the effect of reducing consumption, and the alarm was revived towards the end of the year when it was rumoured, but untruly, that the duty was to be increased. The fall in prices reduced profits on all tea estates so materially that dividends were paid to shareholders in but few cases and then on a very reduced scale. The reduction of prices was the consequence of overproduction, that is, of production expanded in excess of the expansion of consumption in the strictly limited market which now exists for Indian and Ceylon tea. According to the returns made by the owners and managers of tea estates for 1900, it appears that in the five years ending with that year about 107,000 acres were added to the area under tea in India, being an increase of about 26 per cent. This area, in full bearing, can produce at least 40 million pounds of tea. Unfortunately, while reduced prices were the consequence of over-production, they also became the cause of the continuance of over-production, for, to compensate for the fall in prices, as much leaf as possible was taken from the plant, and the quantity was increased

at the cost of the quality. This operation again, by lowering the quality, had the effect of maintaining and accentuating the fall in prices. It is not intended here to tender advice to producers in respect of their own business, or to join in the lively controversy on the merits of "coarse" plucking *versus* "fine" plucking. It is only intended to record the conclusion that, when prices fell because tea was produced in excess, the fall induced directors to endeavour, by further increasing production, to continue dividends to shareholders, and that this endeavour to increase quantity was inevitably attended by a reduction in quality, the combination of the two bringing about a further fall in prices. The obvious inference is that the remedy is inefficacious, and that the quantity produced must be proportionate to the consuming capacity of the market which the tea enters. Either the market must be enlarged, or that area in which tea is produced at the greatest cost, whether by reason of the nature of the soil or of the remoteness and inaccessibility of markets, must necessarily be abandoned and some of the existing tea estates be thrown out of cultivation. The extent to which the supply of Indian and Ceylon tea has exceeded the demand is thus presented by the well-known London brokers, Messrs. Gow, Wilson, and Stanton, in a recent circular (lb):

		Imports.	Consumption.	Excess.
1895	..	233,834,519	227,806,249	6,028,270
1896	..	253,141,438	246,607,478	6,533 960
1897	..	268,865,989	261,875,872	6,990,117
1898	..	276,437,473	279,031,828	—2 594,355
1899	..	302,590,293	288,695,931	13,894,362
1900	..	334,072,942	314,230,316	19,842,626

It appears from these figures that the quantity thrown on the market during these six years has exceeded the demand by over fifty million pounds, and that the excess of the last two years has been quite remarkable, amounting to 33¾ million pounds. As the firm who issue the figures justly observe, there is in this excess supply "abundant reason for the present severe depression in price." If nine-tenths of the Indian and probably a similar proportion of Ceylon production are sent to the United Kingdom, and if the exports increase as they have done from year to year for the last ten years, it is not easy to see how a further fall in prices can be avoided. There is no circle of people in the United Kingdom to whom the advantages of drinking tea are unknown, and it is probably not going in any way beyond the facts to say that every person in the British islands who desires to drink tea can and does obtain of it as much as he or she wishes to consume or can safely consume. It is indeed likely that some, women especially, drink more tea than is good for them. No material expansion of consumption can therefore be looked for amongst the population of those islands beyond that which is the consequence of waste when the article consumed is very cheap, and that which follows the annual increase of population, but the rate at which the population increases is far slower than the rate at which the production of tea increases. For a material increase in consumption, therefore, the Indian producer must look to the further exclusion from the British market of the remnant—some 35 or 40 million lb.—of non-Indian (or Ceylon) tea still taken in that market. He must also depend upon the capture of markets other than that of the United Kingdom. Some progress has been made in this direction, but it is not flattering to our self-esteem to find that in this campaign the producers of Ceylon have made much more headway than Indian producers. The following figures are quoted from a circular issued by Messrs. Gow, Wilson, and Stanton last month, in which they printed a table to show the expansion in foreign and colonial markets of Indian and Ceylon tea:

		Indian.	Ceylon.
1896	..	19,226,789	23,222,434
1897	..	22,440,687	29,074,498
1898	..	25,892,985	36,353,643
1899	..	29,651,933	38,778,595
1900	..	33,566,241	49,255,833

It appears then that the increased consumption of Indian tea in markets outside the British islands between 1896 and 1900 was over 14 million pounds, but the increase of exports from India in the same years was over 41 million pounds. The principal consumers in these markets are:

		million lb.
Australia ..	..	9·58
United States and Canada	..	6·96
Turkey and Persia ..	..	7·71
Germany and Russia	...	5·58
South Africa ...	...	1·27

The owners of Indian tea estates, while striving to gain possession of such markets as these, also recognise, somewhat late in the day, the importance of creating a market in India and in the countries across the Indian frontiers. They have sent a small venture overland from Quetta to Seistan, and are considering arrangements to place packets of tea for sale in the bazaars of Indian cities, at railway stations, and other places where consumers are likely to be found. As these arrangements will be undertaken by an enterprising and substantial mercantile firm in Calcutta, there is reason to anticipate that the business will be done in a manner to deserve success.

The exports of tea have expanded without a pause since 1893-94.

		lb (000 omitted)		R
1893-94	..	126,332	..	6,58,58,355
1894-95	..	129,099	...	7,55,57,447
1895-96	...	137 710	...	7,66,48,887
1896-97	..	148 908	...	8,12,45,480
1897-98	...	151,452	..	8,05,86,233
1898-99	...	157,471	...	8,04,48,038
1899-1900	...	175,028	...	9,09,21,120
1900-01	...	190,305	...	9,55,09,301

Last year's exports were directed as follows:—

				lb (000 omitted)
United Kingdom		..	..	166,171
Australia	..	..	..	10,439
Turkey, Asiatic		..	..	3,240
,, European		..	..	618
Persia	..	...	..	2,429
Canada	...	..	..	1,725
Hongkong	...	...	...	1,143
Germany	..	...	..	838
Russia	..	...	..	772

These are direct exports as declared in India and do not include re-exports from the United Kingdom.

RUBBER SUBSTITUTE.—The following appears in the American Rubber paper:—For Sale, the American patent of a new substitute (floating, white) superior to the best on the market, and already appreciated in Europe. Enormous profit for the manufacturer. Address Substitute, care of the *India Rubber World.*

THE "SHOT-HOLE" BORER.

ADVICE TO THE PUSSELLAWA PLANTERS.

WHAT THE GOVERNMENT ENTOMOLOGIST THINKS OF THE PEST.

At yesterday's meeting of the Pussellawa Planters Associatiou, Mr. E. Ernest Green, the Government Entomologist, attended and gave the members some valuable information regarding the "shot-hole" borer, a beetle which does damage to tea plants.

The Chairman (Mr. G. C. Bliss) said Mr. Green had been making extensive enquiries regarding the "shot-hole" borer, aud his information wonld be valuable to planters. The pest was undoubtedly one of the most serious that attacked the tea plant, and he had offered Mr. Green opportunities of stndying it on the Atgalla estate.

Mr. Green said the insect was a minute beetle known to scientists by the name of *xyleborus fornicatus*, and belonged to the family of scolytidæ. It was popularly known as the "shot-hole" borer. He had known the pest in qnestion for about twelve years in the Nawalapitiya district and probably all those present were well acquainted witb it. They wonld see from the specimens of tea trees that were on the table that the heetle hored holes in the wood, which very mnch resembled a single shot. It seemed to affect the tree from the top to the bottom practically. Its *modus operandi* was to commence from the base and go on to one of the branches; it almost went through the branch, and then took a spiral turn round which girdled the branch just above where it went in. It then went back and made another girdle below the original circle. The object of the beetle was to choke the flow of sap and enable it to go on hreeding without having too much moisture. The way that it had affected whole fields showed that it had been going on for a very large number of years. It was very difficult to do anything with it when it had got to that stage. If it was noticed in tbe beginning, the way to treat it was by cutting and burning the prunings. Where tbe beetle had affected the whole field, of course, to prune would not he worth while, as it would he necessary to practically hack the bush away; he thought the best thing to be done under snch circumstances was to leave as mnch bearing weight as possible and to stimulate the tree by manuring, prodncing more sap to counteract the effect of the beetle. In fields where the beetle had only just appeared it oertainly should be possible to oontrol it hy cutting down below the place wherever the beetle had been, aud carefully collecting and burning the clippings. It would he a great pity in young clearings to let the thing get a hold from the commencement. It was absolutely necessary to burn the clippings. Their Chairman had very kindly consented to undertake any experiments that he (Mr Green) might suggest; it was, however, more or less working in the dark, excepting that they would have to try all sorts of tbings likely and unlikely. Probably they would have to try and find some deterrent which wonld render the bushes more or less obnoxious if attacked after prnning, and he proposed experimenting in that way. He would put the result of what would he done in black and white for the benefit of the planters, and he hoped to be ahle to himself find the time to supervise the experiments and see how they were going on. His main object at present was to point out the gravity of the pest. When it had got to the stage in which it was at present on many fields they never knew where it would stop. After pruning, they would find that a certain number of the hranches did not throw out any shoots, or at any rate they were very much retarded and might appear a month or six weeks after the main part of the bush. That was because of the heetle, and they could easily see that there was no limit to its ravages. It had thoroughly infected the estates around Nawalapitiya and Gampola, and it had also appeared sporadically on one or two estates up-country. Many people had an idea that it had got into the estates from the grevillea trees; he (Mr Green) had examined those trees and came to the conclnsion that it was mnch more probahle that it had got into the grevillea trees from the tea. With the assistance their Chairman had been good enongh to offer, he hoped to be able to do something. (Hear, hear.)

Mr. Green produced specimens of the male and female beetles, which were examined with interest. The beetle was allied to the true weevil, but it had not the long snout. The weevils were very dangerons, hut as a rule they preferred dead wood to any other. The shot-hole borer unfortunately, preferred the half-living wood, for, as soon as the branch was absolutely dead, it seemed to desert it, or at all events did not oontinue to breed in the dead wood.

Mr. Christie enquired whether the beetle was able to fly and whether it did fly.

Mr. Green said the female insect flew about, bnt the male insect had no wings. The male insect was very mch smaller than the female.

Mr. Christie asked whether Mr. Green would recommend the prunings to be hurned green, or would it be sufficient to burn them afterwards, as there was, of course, a difficulty in burning the green prunings.

Mr. Green said it was most important that the prunings should be hurned as soon after being cut as possihle. It wonld be a great mistake to let the branches dry, and if the hrancbes were only scorched when green and not entirely consumed, it might be enough. He had made experiments to try and attract the beetle by light and also with a preparation of alcobol, hut the only result was the inebriation of ants. (Laughter.) It was a very bad night for the experiment, as there was a very bright moon and few insects were flying about, and as he did not consider it by any means conclusive, he meant trying again under more favonrable circumstances.

The Chairman thanked Mr Green for the information he had given the meeting. There was no doubt that the shot-bole borer was a very serious pest, he would say the most serions pest that they had. The best return they conld make to Mr Green for his kindness in attending the meeting and giving them information as he had done was to thoroughly try every suggestion that he made, and thus co-operate in the attempt to exterminate the pest.—Local "Times," July 26.

A BOOK ON MOSQUITOS.

Dr. Howard, Chief Entomologist of the United States Department of Agriculture, has published a book on Mosquitos, in which the fly and the remedies to be used against the infection of malaria and yellow fever are fully treated. It is published by M'Clure, Phillips, and Co, New York.—*Globe*.

Quinine-Injections.—M. Emery-Desbrousses reports that during the Madagascar expedition the military physicians found themselves frequently obliged to administer quinine hypodermically to soldiers with fever. It was found, however, that patients who had received the injections of quinine developed tetanus. The injections had been made in the limbs, and were then ordered to be made under antiseptic conditions in the abdomen and sides, with the result that no further case of tetanus was produced. These facts suggest that tetanus may have a non-microbic origin, the cause being probably aneuritis, due to irritation caused by the quinine solution.—*Chemist and Druggist*, July 13.

TEA, RUBBER AND CLOVES IN THE STRAITS.

A resident of Malaeea, on a visit to Singapore, states that the tea indnstry is making headway there by leaps and bounds. It is now just over nine years ago sinee the first seed was planted upon the soil of the Peninsula, and the enterprise of those who have pioneered the country has been well rewarded. The area under cultivation on one estate is 500 acres. Tea, together with para rubber and cloves, which have a great futnre before them, will soon, it is said, form important items of export from Malacca. Already, four thousand pounds of tea a month are exported, and the demand for the leaf is growing.—*I. P. G.*, Aug. 3.

YIELD OF TEA PER ACRE IN CEYLON.

The question has been asked us by Mr. Bamber: - Is the average yield of tea in Ceylon per acre increasing or diminishing? It is not easy to find out exactly; but if we begin with 1896, the export of that year of 108,141,000 lb. must have come from about 273,000 acres, making an average of 396 lb. an acre; in 1897 our crop was 116,054.000 from 288,000 acres, giving 403 lb.; in 1898, we find 305,000 acres giving about 120 million lb., or very close on 400 lb.; then 1899 we had very nearly 130 million lb. from 330.000 acres which again works out as nearly as possible to an average of 400 lb.; while last year our crop of 148,431,000 lb. must be reckoned as from 350,000 acres which would give an average of 424 lb.—so that manure has not done much more than maintain the average for the past five years, and evidently "fertilisers" will be required to keep up a large number of the older plantations especially.

PLANTING NOTES.

Rubber.—The "India Rubber World" has been applied to, through the eonsulate of Salvador at New York, for information bearing upon the suitability of the Ceara rubber tree for cultivation in that republic. A late issue of the Salvador *Boletin de Agricultura* prints an advertisement of Ceara rubber seeds for sale in San Salvador, and also mentions the planting at San Miguel of seeds of *Sapium biglandulosum* an important rubber tree of Columbia.—*India Rubber World,* July 1.

Odontoglossum Crispum Pittianum—is the name of the famous orchid, which was in flower at Mr. Borace Pitt's plaee, Rosslyn, Stamford Hill, when last mail left, and has won the highest prizes at home. It was discovered three years ago by the agents of Mr. John Corder, the eollector, in the Columbian Woods, flovered near London last year for the first time in Europe, and stands only second to Baron Schroder's anatum.

Manure for Tobacco.—Where wattle ashes can be procured, they are said to form an excellent manure for tobacco. Mr. J. M. Van Leenhoff, tobacco expert in Natal, states that they may be used for procuring a mild, good-burning tobacco. The ashes should be ploughed in very shallow, four or five months before planting.—*Queensland Agricultural Journal.*

The Report on the Government Horticultural Gardens, Lucknow, for the year ending 31st March 1901—does not contain much of interest to Ceylon readers; but we quote on fruit culture:—

The principal frnit crop in the garden (from a revenue point of view) viz. the mango crop, was almost a complete failure. Pine apples were fairly good. Nearly all sections of the citrns family did well, the Sylhet oranges and pummelos bore good crops of fruit; peaches and *aluhukharas* were moderate crops, but *aluchas* were bad, *loquatas* were a light crop, while figs and *leechis* were fair crops The seedling Malta orange trees again bore well, and a large amonnt of seeds was secured from the fruit and sown with the object of raising a good stock of seedlings, among which possibly new varieties may eventually be found.

Cinchona Bark Prospects.—Messrs. C. M. and C. Woodhouse report on 9th July, favourably, as follows:—

In spite of the temporary depression in the Quinine market, the *present* statistical position, taken as a whole, cannot be considered unfavourable. On the one hand, the exports of Bark from Java for first six months show an increase of about 1,100,000 Amst. lb. compared with last year, and 130,000 lb. compared with 1899, but this is probably more than balanced by decrease in exports from British India. It will be noticed that during the last three years the exports from Java during the last six months of the year have been nearly the same as a *total*, though they have differed very much month by month. They have averaged slightly over 1,000,000 lb. per month. The Stocks of Bark in London (which are now 11,107 packages, against 16,598 packages in 1900) were reduced by 7,600 packages last year between 1st July and 31st October. A similar reduction this year would not leave London with much stock. The Stock of Quinine is now slightly the largest of recent years, but as Importations since 1st January are 200,000 oz. less and deliveries 100000 oz. more, it is evident that it mns compare more favorably with last year now than it did on 31st December. After all it only represents about three months of world's consumption, and in the absence of stocks of Bark it forms the only reserve to meet any extra demand that might arise. Consumption shows a marked increase this year, especially in United States, British India and Italy.

A Colonial Garden at Paris.—Do Englishmen appreciate Kew? What is certain is that foreigners envy them their superb botanical garden. The Dalham Gardens at Postdam are probably known to German tourists, and an interesting *brochure* about the Kolozsvar Gardens (Hungarian University) was distributed to the members at the Paris 1900 Botanieal Congress. The Paris Jardin des Plantes is a small, starved affair. The Colonial Garden at Nogent-sur-Marne, near Paris, is a new and interesting experiment by the French Government. M Dybowski, the superintendent, is an African explorer and an ex-director of agriculture in Tunis, Many interesting studies and experiments are carried ont in his pleasant leafy gardens, near the Bois de Vincennes. Naturally there is a laboratory, to which any explorer from the French colonies has only to submit his specimens and a scientific analysis will be made gratis. The results may be exploited by the explorer, and the Garden does not interfere with his commercial rights. As a consequenee of this, it is reported that two kinds of wood from the Congo were shown at the 1900 Exhibition, and examined by the laboratory. From these a new perfume is now made, which, if properly pushed and advertised, may be worth a fortune. We have Congo soap: why not Congo perfume?—*Chemist and Druggist.*

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop, August-September delivery 1901 ; booking necessary before the end of April ; quantities of 100,000 and over at special low rates. Plants available all the year round. 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900:—" I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year."

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery, 1901, booking necessary before the end of March ; large quantities on special terms ; Plants in Wardian cases.

Manihot Glaziovii—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter, in sending an order for this seed, wrote on the 22nd August, 1900:— " If they arrive fresh and germinate easily I may send you larger orders, as they are for high grounds where the Castilloa does not thrive."

Kickxia Elastica.—(*Funtumia Elastica*).—Seeds and Plants, orders booked. (Lagos rubber.)

Ficus Elastica.—Seeds available in May-June ; booking necessary before the end of March ; also plants.

Urceola Esculenta and **U. Elastica.**—Same as above. (Burma rubber.)

Parameria Glandulifera.—Orders booked for seeds for January-February delivery ; also plants; immediate booking necessary. (A good rubber creeper of Malacca.)

Landolphia Kirkii.—Seeds in July-August, early booking necessary. Plants can be supplied all the year round. (A highly-recommended species.)

Chonemorpha Macrophylla.—Seeds and Plants ; orders booked. (A very valuable rubber-yielding creeper.)

Memusops Globosa and **Payena Leerii.**—Seeds and plants in July-August, booking necessary before April.

Achras Sapota, Willughbeia Firma, W. Edulis and other **Rubber and Gutta Percha** yielding Trees and Creepers, Seeds and Plants.

Cinnamomum Zeylanicum (Cinnamon superior variety). New crop of seed in April to June, booking necessary before the end of February ; also plants.

Coffea Arabica, Liberian Hybrid and **Maragogipe Hybrid.**—New crop March-April ; immediate booking necessary.

Cinchona Ledgeriana.—Seeds now ready, also other varieties.

Seeds and Plants of Nutmeg, Clove, Sandalwood (white and red), Pepper, Cardamom, Vanilla, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products of Foreign countries for 1901-1902, now being prepared, and will be ready in a few months.

" South Africa."—The great authority on South African affairs of 25th March, 1899, says:— " An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbling. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Price List of Seeds and Plants for Ceylon use, post free, on application.

Our new Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms &c., Timber Trees, Trees for Avenues, Hedges, Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants ; and Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons, Orchids, Bulbs, Dracænas, now being prepared, and will be ready shortly.

Special Arrangements made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in large quantities.

Agents in London:—Messrs. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address:
William, Veyangoda, Ceylon.
Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
Henaratgoda, Ceylon.

THE INDIAN TEA ASSOCIATION (LONDON).

The following is from the annual report of the Association :—

The General Committee of the Indian Tea Association (London) have the pleasure to submit to members the following statement on the conclusion of the twenty-first year of its operations.

THE INDIAN TEA CROP OF 1900.

The estimate of the crop issued by the Indian Tea Association in Calcutta on September 8, 1900, which was based on the actual outturns of tea to August 15, 1900, was in round figures as given below, the final results being alongside for comparison :—

District.	Estimated. million lb.	Actual Crop. million lb.
Assam ...	66¼	68
Cachar and Sylhet ...	60½	61
Darjeeling and Terai ...	10¼	11
Dooars ...	23	30
Kangra Valley, Dehra Dun, Chittagong, Kumaon, and Chota Nagpore ...	6	6¼
Private and Native Gardens, including those from which no returns were received ...	16	11¼
	182	187½

Owing to incomplete returns, about five millions pounds of tea were included in the last item of the estimated crop which should have been added to the figures furnished for Dooars.

The crop of 1899 was 175 million lb, the increase in outturn last year being therefore 12½ million lb, exclusive of the tea produced in Southern India, of which no reliable statistics are obtainable.

GREEN TEA.

As mentioned in last year's report, a bonus of 1½ anna per lb. was offered to planters who were prepared to manfacture green tea for the American market, but the committee regret to say that few applications were received for the same, and it is not, therefore, as yet definitely ascertained how far tea of this description can be made in India to take the place of the China and Japan greens, now so largely consumed in America. A misunderstauding also arose in Calcutta as to the terms on which the gardens applying for the bonus were entitled to receive it, and the proposed 200,000 lb were not made. The offer of a bonus at the same rate has been renewed for the present year, and it is hoped that in view of the great importance which attaches to the securing of this outlet for Indian teas, more advantage will be taken of the offer.

The terms of the committee's resolution on the subject were as follows :—

"That 1½ anna per lb, up to a maximum of 200,000 lb to be manufactured this season, be allowed out of the funds of the levy on shipments of green tea to the American market sent there direct from India, such funds to be distributed as a bounty at the discretion of the Calcutta Committee, the dinition of the term 'green tea' for the receipt of the bounty being taken to be tea made from the ordinary leaf plucked on the gardens such as would ordinarily be made into black tea, but which in its altered manufactured state would not compete with the sale of black tea in America or elsewhere. The bounty to be paid on the same quantity as before sanctioned, viz., 200,000 lb, until it is seen what success is attained in the manufacture of green tea.

"The Association in Calcutta to be requested to notify the committee promptly if a larger quantity than 200,000 lb is likely to be specially prepared for shipment to America."

In a report furnished by Mr. William Mackenzie in connection with a recent visit to America, he says that of green teas and partly fermented Oolongs and Formosas the imports are about as follows :—

		lb.
Green Japans	..	36,000,000
Green China	..	15,000,000
		51,000,000
Oolongs and Formosas	..	17,000,000
		68,000,000lb.

[Then follows Mr Mackenzie's statement as to winning the market for green teas, familiar to our readers.—ED. *C. O.*]

To attain success, however, Mr Mackenzie recommends a syndicate being formed in Calcutta and another in Colombo, to take over the green teas manufactured, and to blend and pack the same in uniform and attractive packages, making regular shipments to one or more firms in America, so as to ensure continuous supplies of teas of standard qualities. The committee have advised that steps should be taken in Calcutta to carry out Mr Mackenzie's commendation.

It is essential also, the Committee consider, that Indian planters should make greater efforts to produce the class of tea required, which, so far, they do not generally appear to have succeeded in doing.

LEVY FOR 1901.

The large increase in the crops of British grown tea in 1900 has rendered it imperatively necessary that continued efforts should be made to find new outlets for the growing output, and as will be seen by the lately issued report on the operations in America and other foreign markets for the year ending May 31, 1901, it has been decided to call for a levy for 1901 on the same basis as in previous years, viz.:—4 annas per acre of cultivation and ½ anna per maund of tea manufactured, to be paid as usual in Calcutta, and the Committee earnestly beg that all interested in the welfare of the industry will subscribe to the fund.

WORK ON THE CONTINENT.

Mr. J E M Harington, as mentioned in last year's report, was deputed to visit Italy, Turkey, Austria, and Germany to inquire as to the prospects for Indian teas in those countries, and the best means of increasing their sale. Mr. Harington afterwards visited Belgium, and extracts from his reports are annexed:—The tea rooms in Rome, which were subsidised on Mr. Harington's recommendation, have since been successful in enlarging their sphere of operations, and branches have been opened by the proprietors in Florence and Naples, where a taste for Indian teas appears to be developing. The question of opening tea rooms in Berlin and Frankfort is now under consideration, as well as the establishment of an agency in Antwerp.

The committee have come to the conclusion that now is the time to make a strong effort to develop the market in Russia for Indian teas.

Messrs W J and H Thompson in their last annual report point out that Russia is a most hopeful market; "because it requires black tea, appreciates quality, and is taking more from us every year by direct importation, or from London; it, too, is calling for better tea."

The committee are now in negotiation with an agent who has been in the tea business for many years, and who, it is thought, will prove a good medium for carrying out the measures which may be considered desirable in order to push the sale of our teas in Russia.

TEA SAMPLES BY POST.

Further correspondence has taken place between your committee and the Postmaster-General on the subject of permitting samples of tea to be sent by the sample post in hermetically sealed tin boxes so as to fully preserve their condition. Unfortunately, it appears that the department is precluded under the conditions settled by the last Congress of the Postal Union, which met at Berne, and which will not reassemble until the year 1903, from allowing samples of tea to be sent at the sample-post rate of pastage, except when packed in such a manner that the contents can be examined. The Postmaster-General has therefore been asked to take the earlist possible opportunity to get this particular rule amended.

DOCK TRUST FOR THE PORT OF LONDON.

As was mentioned in last year's report, it was considered advisable, in the interests of the tea industry, to support the opposition to the proposals of the dock companies, and a donation of £10 10s. was given to the London Chamber of Commerce towards the necessary expenses. The Royal Commission appointed to consider the whole question of dock accommodation for the Port of London is now engaged in taking evidence on the subject

PRIVATE AUCTIONS

Importers having been approached by the buyers with a view to the restriction of the publication of prices realized at auctions, a meeting was held on December 11, 1900, to consider the question. It was then suggested that the printing of garden marks in the catalogues might be discontinued, but this proposal was not approved of by the Association.

Afterwards a proposal to establish a Tea Exchange was put forward, and a meeting of the committee was held to discuss the matter on April 23 last. Considerable divergence of opinion was found to exist on the subject, and no decision was come to.

As an outcome, however, of these proposals, some importers, with a view to meet the wishes of the tea buyers, expressed their willingness to the experiment of offering their teas at private auctions, and the Tea Brokers' Association was asked to draw up rules for holding these. These rules have now been formulated, and the first sale under them took place on July 4, when a quantity of Ceylon tea was catalogued.

[Reference is also made in the report to the following subjects, all of which have been fully dealt with in our columns during the past few months—Reduction of output; the import duty on tea; the Labour Bill; Consular reports on the position of the tea trade in various countries; Indian tea at the Paris Exhibition; regulation of sales; and tea statistics.]

TEA BLIGHTS, &C.: THE DISTRIBUTION OF FUNGI SPORES.

A USEFUL SCHEDULE FOR OBSERVATIONS.

The following schedule of observations to be taken by the co-observers in the tabernacle experiments, planned to gain information as to the distribution by wind, insects and other agencies of spores of parasitic fungi, has been issued from the Scientific Department at Peradeniya Gardens :—

The Mycologist, while wishing to reduce the amount of trouble taken by each observer, will be glad to receive as complete answers as possible. If the terms suggested in the footnotes only are used the comparisons of the observations at the different stations will be simplified. When convenient the returns should be sent to Peradeniya next day, so that the diseased leaves can be examined with little delay. All the diseased leaves should be sent unless too bulky, when they should be weighed and the weight sent, with as many of the leaves as possible. The tabernacle should be kept closed and only the kangany or cooly who is to pluck the bushes admitted.

Name of Estate; Date of Plucking; Weather Conditions (very wet, rainy, no rain, no sun, sunny, hot sun); Wind (no wind, little wind, variable, constant wind, strong wind); Weight of leaf plucked from enclosed bushes (green); Approximate number of bushes from which the diseased leaves came; Conditions of nearest bushes on north side of tabernacle; Condition of nearest bushes on south side of tabernacle; Does the flush on enclosed bushes fairly agree with the rest of the field? Remarks or Observations.

[The tabernacles are all erected or will be by the end of September. They are at various heights from 50 to 5,000 feet above sea level and in various districts in which the areas over which the wind has passed is different. Nothing has been done to solve some of the knotty questions as to spore distribution by wind, heretofore, and as this has a most important bearing on the spread of diseases caused by parasitic fungi, all knowledge gained by these experimental screens will be valuable.—Ed *T.A.*]

PEARL OYSTER INSPECTION.

Captain Donnan's last inspection was a very full and exhaustive one and his Report is now published in a Sessional paper, the summing up of which runs:—

The result of the inspection may be summed up thus. There are nine pearl banks with oyster beds on them aggregating 8,338 acres in area, and estimated to contain nearly 543 millions of oysters, most of which have survived their first year on the beds, which is the most disastrous period to young pearl oysters. Of the nine banks the two chief and largest ones, the Cheval and Muttuvaratu, attract the most attention. Both of these banks are now largely stocked with young oysters, and judging by their present condition they ought to be capable of giving two large fisheries in succession each, the first one coming off in March 1903, by which time the large number of oysters now estimated to be on them will no doubt be much reduced, probably by half. Of the remaining seven minor banks the Periya Paar Karrai, Kondatchi, Paar, Karaitivu Paar, and Alautura Paar may probably keep a due proportion of the oysters now on them until they arrive at maturity but the times remaining banks I have no faith in.

Captain Donnan concludes that rock fish running from 5 to 15 lb. weight each, are responsible for the destruction of young oysters. As regards the conservation and culture of oysters, there is the following interesting paragraph :—

A few months ago in Colombo I had a visit from Dr. H Lyster Jameson, Fishery expert, on his way home from Conflict Group, British New Guinea, where he had been studying the subject of pearl oyster cultivation on behalf of a London Company, which had sent him out for that special purpose. Dr. Jameson told me that the oyster he had to deal with is commonly named the black lip, a different class of oyster to that of the Gulf of Mannar, but be had not doubt the system of cultivation or preservation that would suit the black lip oyster would also be found suitable for the Gulf of Mannar oyster. He also said that after studying the question for some time, he had come to the conclusion that the only successful way of dealing with the black lip oyster would be by placing the young oysters in baskets made of wire meshing, of a suitable size of mesh, and then placing the baskets on the oysters' natural beds and keeping them there until they were old enough to be able to resist attacks of their enemies ; then to take them out of the baskets and lay them back on their natural home without the baskets. And he was of opinion that beds similar arrangement would be likely to prove the most successful in dealing with the Gulf of Mannar oysters. I quite agree with Dr. Jameson that his plan would be likely to prove quite successful as regards preserving the oysters, but I am inclined to believe that by the time such oysters came to yield a fishery, what with the cost of the number of wire baskets that would be required to cover the bottom of a pearl bank—say, half a mile square or more—the cost of a staff of boats and divers required to place the baskets on the bottom, and to take them up again after (say) two years, remove the oysters, and place them back again without the baskets, there would not be much profit left from the fishery.

Mr. Jameson (who called upon us) had much the same experience as Mr. Savile-Kent. No doubt, Professor Herdman, F.R.S., who is coming out in charge of the Ceylon investigation, will inquire into all that has already been done off the Australian coast with a view to its bearing on the conditions found in the Pearl-oyster Banks of Ceylon.

PROPOSED TEA-GROWERS' ASSOCIATION IN LONDON.

THE MEETING OF IMPORTERS.

(*Special Report.*)

LONDON, July 19.

There was a meeting of some 20 of the largest Tea importers at Winchester House on 17th inst, to discuss a proposal to form an Association with a capital of £1,000,000 to protect Indian and Ceylon Teas in the London and other markets.

Mr. THOMSON of Messrs. Whittall & Co. was in the chair and briefly explained the scheme which was, he said, to regulate the quantity of tea for the Trade by purchasing any quantity in excess of actual requirements and holding the same—until required. Some discussion was begun by those present on the details of the scheme, when Mr. H K RUTHERFORD pointed out that it would be advisable, before they went on to discuss the details, that the meeting should come to a decision whether such a gigantic combination was necessary in the interests of growers at the present time. He said that, after giving the matter his most careful consideration, he regretted he did not see how he could support the scheme. The present state of affairs solely hinged on the question of supply and demand, and he firmly believed, with the influences now at work, that supply and demand would become more evenly balanced in a shorter time than most of them seemed to think. The proposed scheme did not strike at the root of the existing evil ; as it would still leave the surplus tea in existence and act as a drug on the market, whereas he contended, if a remedy was necessary, it could only be found at the fountain head and that was either in the non-production of the tea or the opening out of new markets, or a combination of both, and not in simply holding the tea off the market for a given period. Poor lands going out of cultivation would, he thought, counterbalance the crops from new areas coming into bearing; the unlikelihood of a favorable season taking place concurrently in India and Celyon in 1900 and the expansion of new markets coupled with the severe lesson planters had learned from coarse plucking last year, would inevitably tend to bring supply and demand into closer relationship, and prosperity would return. This scheme, which was to protect the grower, instead of diminishing the output would have the tendency to increase it, as the proprietor with a non-paying estate would make as much tea as he could if he were assured of protection to even ½d per lb over the cost of production. We were undoubtedly, as had been pointed out by Mr Thomson, at the present time in the hands of the buyers, as regards the price of our teas. This was only the natural position, for, when there was an over-supply of a commodity, the purchaser had the seller under his control, but the position becomes reversed when the supply is not in excess of the demand. This altered situation was bound to come about in the tea industry in time, and we could not force that period by any such scheme as the one proposed as it did not permanently get rid of the tea. He concluded by saying that, once this crisis of over-production was over, which he ventured to predict was not far off, we would gradually enter a period of remunerative prices, and he did not think that in our time at least we would again suffer from over-production.

MR ALFRED BROWN said he regretted he could not share Mr Rutherford's views, and he also had given this matter a great deal of thought, and willingly hailed the proposal for the promotion of such an Association. The buyers had combined and were strong, and unless we also combined we would continue to be in their grasp even if there was no over-production. It would require a very great margin between supply and demand to make them compete and pay up for our teas. He asked how it was that, before we heard so much about over-production, indeed since 1890, the price of teas had gone steadily down, entirely in his opinion through the workings of the dealers' combination to keep down prices, and we would never be right until we put combination against combination. He certainly thought that some combination was necessary.

Mr. W McKENZIE pointed out that the gradual fall in the price of tea dated from the time of the packet-tea man, and that Lipton Ltd. made nearly the entire profit of their business out of tea, selling most of their other commodities

at cost, or under. He could not agree with Mr Rutherford in his opinion that Ceylon had practically reached its maximum production. Ceylon, if prices improved, could double its yield by manuring, so the question was a wider one than that of excessive areas of new land coming into bearing. With reference to green tea, there was an enormous field for their energies in America and Canada; but he regretted to say, while they talked of combination between India and Ceylon, the former had started to undersell the latter in green teas, and this, he understood, arose from India giving a higher bounty than Ceylon. This state of affairs should not be allowed to go on.

Mr. Jas. Sinclair said he would like to know if any one present could authoritatively say there was a combination among dealers or whether the low prices of our teas were solely due to excessive supplies.

Mr. Magor (Williamson and Magor) gave it as his opinion that what importers suffered from was the want of combination to give the trade the quantity required at the proper time. At one time of the year we throw thousands of chests at them, and sell regardless of price. At another time we have nothing on the market. He thought if an Association could be formed to "carry" the tea it would be a good thing, and he also thought it was necessary to have such an Association. He believed, if the great mass of importers came to this conclusion, then he was sure the money would be forthcoming.

Messrs. Macleod, Bryans and others spoke in favor of something being done, if not exactly on the lines proposed, in some way that would limit the offerings to the buyers,

It was finally decided to appoint a Committee of eight, four representing India and four Ceylon, to consider the whole question and report.

BRAZIL'S ECONOMIC POSITION.

TOO MUCH COFFEE.

The production of coffee in Brazil is so severely felt, says Mr. Consul Rhind in his report on the financial economic situation in Brazil, that a strong opinion has gained ground that a 20 per cent. reduction in output is necessary and that compulsory destruction of the crops to that proportion should be insisted on.

It is stated that the world's production of coffee now attains 16,500,000 bags per annum, while the consumption is only 14,500,000, the excess of 2,000,000 bags being attributed entirely to Brazil; and it is felt that this surplus should be done away with.

Happily, other action of a more practical nature has, in the meantime, been taken to relieve the agriculturists, in the form of reducing the railway freights and conceding extension of time for foreclosure of mortgages on agricultural estates. The improvement in the valuation of Brazil's fiduciary currency by the recent funding operations is incontestable, and the appreciation attained, in combination with the system applied in the collection of duties, more than balances, from the importer's point of view, the additional gold taxation now imposed. In demonstration of this fact the following table may be instructive.

It is intended to show the relative cost in milreis of a parcel of goods invoiced at £5 and paying duties to the amount of 30 milreis at the higher exchanges of the present time, as compared with the local cost of a similar value at the time when the Funding Loan was arranged.

Year.	Rate of Exchange per Milreis.	Currency Value of £5	Proportion of 30 Milreis Duties Payable in Paper.		Proportion of 30 Milreis Duties Payable in Gold		Total Cost of £5, with Duties of 30 Milreis included.
	d	Reis.	Per cent.	Reis.	Per cent.	Reis.	Reis.
1898	6	200$000	100	30$000	..	..	230$000
1899	7 7-16	161 340	90	27 000	10	10 890	199 230
1900	8¾	137 140	80	25 500	15	13 800	176 440
1901	12½	96 000	75	22 500	25	16 200	134 700

On a transaction, therefore, as here imagined, there would be, at the rate of 12½d per milreis, a reduction of 95$300 reis in comparison with the conditions prevailing in 1898.

Unfortunately the necessity for increased taxation has shown itself simultaneously with a great local depreciation in the value of the national produce, which depreciation, strange as the statement may seem, is in great measure due to the enhanced sterling value of the currency. It is not always realised that, although expenditure within the country has naturally to be liquidated in paper currency, the exports, which represent the marketable wealth of the community, are valued according to the sterling value on consuming markets.

Thus, a bag of coffee which, when exchange is at 6d per milreis, may be worth in London 30s, is still worth there only the same amount if exchange be at 12d, but locally the 30s represents 60 milreis when exchange is at 6d and only 30 milreis when exchange is at 12d. With the rise of exchange, therefore, the local value will have diminished by 50 per cent. This is exactly the position of coffee at the present time.

Altogether it is a trying time for Brazil, and there is a general absence of prosperity amongst the community at large.—*Sell's "Commercial Intelligence."*

"Nigeria and its Trade"—is the subject of a paper in Murray's "Monthly Review" from which we quote:—

Practically speaking, the exports of Nigeria are confined to palm-oil and kernels. A little rubber comes out—there will be more some day, though at present Lagos holds the monopoly—but to all intents and purposes a little nut accounts directly or indirectly for the white man's presence in Nigeria. It grows beneath the curving fronds of a palm in clusters which, although it is not a very good simile, resemble a pineapple, and when detached it looks like a plum painted scarlet and saffron. Under the thin skin lies a layer of scented grease, which is scraped off, and boiled to extract the fibre, and the result is palm-oil, indispensable in many manufactures, and worth from £20 to £25 a ton. Then there remains a thin-shelled nut, which is cracked, and its two back kernels thrown into baskets, to be shipped by thousands of tons to Europe for oil-extraction. It is a simple process, for it must be remembered that the tribesman, who makes no attempt at cultivation, merely gathers what Nature lavishly provides, but it is probable that every few puncheons cost a human life. The possession of favourite native markets is periodically fought for, petty robber chieftains waylay the oil-carriers going down stream, or exact illegal blackmail, until an expedition is sent up against them, while the mortality among the white men who purchase the oil is very heavy.

THE TRAGEDY OF COFFEE.

We drink our coffee as a matter of course for breakfast; we sip it contendedly after luncheon and dinner; but never a thought passes through our minds of the tragedy that may lie in the accustomed cup. Yet many a brave British heart has been broken, and many a British life sacrificed in the struggle for the berry which we buy complacently from our grocer, and grumble over when, over-roasted or badly prepared, the beverage turns out too bitter for our taste. If our coffee be bitter, we ring the bell and the servant takes it away. If their coffee proves bitter they have to drink that bitter drink to the last dregs, waiting silently until death shall remove them out of the loneliness of exile and close their eyes to the hopeless wreck of all youth's golden dreams. They—those well-plucked British coffee-planters—have suffered defeat through no fault of their own. It was just the luck of life. They had to battle against Nature; Nature was too strong for them: she remained the conqueror. Woe to the conquered!

Most of the coffee consumed in the United Kingdom comes from Ceylon and Southern India. Five-and-twenty years ago Ceylon was practically ruined as a coffee-producing country. Men, who two or three years previously had been accounted almost millionaires, found themselves face to face with absolute proverty. This was due to the appearance of a red fungus called the "hemileia vastatrix," which wasted thousands of acres under coffee. The long and glorious records of the Empire hold no more splendid illustration of grit and iron determination than the final triumph of Ceylon over this overwhelming disaster. There was no wailing, no thought of retreat, but first cinchona cultivation was tried, then tea-growing, and new methods were introduced on the few surviving coffee plantations, until at last the tide turned, and prosperity reflowed, but in fuller flood than before. In South India the story of coffee growing reads the same, but with this difference. In the isle of spices the whole community suffered simultaneously, on the mainland individuals have fallen one by one.

Coffee and tea belong to the same natural order of plants, but, whereas tea is the easiest plant possible to cultivate, coffee is the most difficult. It needs a peculiar climate, one free from extremes of heat and of moisture. If too dry the shrub will not blossom freely, if too wet after a few years it falls an easy prey to one of the many pests that beset it. In India the virgin forest that clothed the Western ghats were selected. Young fellows with capital at their backs and enthusiasm in their hearts threw themselves gladly into the enterprise. The life was lonely but adventurous, and visions of fortune danced before their eyes. Only a few, a very few lucky ones, ever realised them. The forest soil was sodden with malaria. In the early days a mud hut, grass thatched, was the recognised planter's home. When the rains came, and for weeks the hills were enveloped in cloud and mist, he lived perpetually in sopping raiment. There was no leaving the work then, for it was the time for planting out. So in utter loneliness he shivered and sweated when the fever gripped him; no doctor within fifty miles; his next-door neighbour five miles away. He vainly hoped for better days. One would die before his capital was half expended, another would live on till all his money was gone, his property mortgaged to the hilt. Then followed foreclosure. Perhaps he would receive a pittance to manage what he had formerly owned, or else the plantations on which his life's work had been spent, and to which health and fortune had been freely given, would be again swallowed up in the jungle. There are valleys in Southern India into which literally tens of thousands of pounds sterling have been poured, and from which not a dozen good crops have been picked. A more melancholy prospect than an abandoned coffee district can hardly be imagined, and the sadness of the scene deepens when it is remembered that every ruined plantation means at least one brave life broken in exile.

The contrast between a thriving and a deserted district is not a whit greater than between life and death. There is no happier prospect than a planting district in full working order. Every acre has been won labouriously, and at risk of death in the jungle. Until the European planter came, these acres of dark-green coffee bushes were the haunt of wild elephant, tiger and bear, and where today go up the sound of the healthful toil and the bright laughter of children, formerly the silence was only broken by the booming cry of the black monkey and the hideous laughter of the solitary jackal. The coffee planter has done well for the land of his adoption, cruel stepmother though she has often proved herself. He has created a new industry; he has given work at high wages to thousands who needed it; has practically populated the solitudes, drawing the people from areas already too thickly crowded—war against nature no less than war against man has its roll of martyrs, of victims, and of heroes, and the roll of coffee planting is brilliantly illustrated with many bright deeds of which the world has never heard and never will hear anything. The good work still goes forward in Ceylon and in South Africa, and has also now been extended to Central Africa. On the Shiré Highlands coffee plantations have been opened by Europeans, and there again the white planter is proving himself a true philanthropist.

Of recent years the coffee planter's life has been brighter. His bungalow nowadays is a pleasant brick house, embosomed in trees and surrounded by a garden An epoch of prosperity, all too brief, enabled him to make himself comfortable. Many married. But there has been a return of bad times. Prices have fallen when the seasons have been good, and short crops have not raised them. Tragedy still lurks in those hospitable bungalows. Coffee is a bitter brew for many a planter today. He seldom grumbles at fate, though constantly at the weather. He fights on to the last without a thought of surrender, and when the end comes, leaves behind a memory of silent endurance and unfailing courage, which all who knew him love to cherish. Over the lintel of the coffee planter's bungalow might be engraved those lines from Kipling's sorrowful song of exile:—

"Oh, the toil that knows no breaking! Oh, the
heimweh ceaseless aching!
Oh, the black dividing Sea and alien Plain!
Youth was cheap—wherefore we sold it; Gold was
good—we hoped to hold it;
And today we know the fulness of our gain."

—*Globe*, July 9.

TEA CROPS AND MANURE.

It may be of interest to mention the imports and transport (by Railway) of manure, for the series of years corresponding to those for which we have reckoned the average yield of tea per acre. Taking the country as a whole, it is not easy to say on what particular crop, within one, two or three years, an application of manure has most effect. But for a rough comparison it will do to contrast the "manure" figures for any particular twelve months with the succeeding year's yield, thus:—

Average yield of tea per acre.			Imports of Manure. tons.	Carried by Rail: tons.
		1895	... 12,487	7,213
1896	... 396 lb;	1896	... 11,576	8,186
1897	... 403 lb;	1897	... 10,874	8,431
1898	... 400 lb;	1898	... 12,745	9,025
1899	.. 400 lb;	1896	... 14,200	11,126
1900	.. 424 lb;	1900	... 20,341	17,717

It may be said that the increased yield per acre last year corresponded with an increased application of manure in the previous twelve months; but the most striking fact is the enormous increase in imports and carriage upcountry of fertilizers during the past year. With "fine plucking" following on "liberal cultivation," estates should continue in very good order for some time.

SUB-TROPICAL CULTURE IN QUEENSLAND.

VITICULTURE.

The area under vine cultivation in Queensland last year was nearly 2,000 acres, showing an increase of about 300 acres on the two preceding years. To judge from the demands made on this department for cuttings this season, the area is being rapidly extended, applications for upwards of 8,000 cuttings in excess of last season having already been made. Fruit-growers are beginning to find out that a vineyard properly looked after is a paying undertaking, and that the demand for grapes exceeds the supply. If table grapes are sold at as low as 1d per lb., the return from an acre of vines is not less than £18; and if sold at 2d per lb., a common price, the return is £36 per acre. Wine grapes would return not less than £10 and turned into wine by the grower himself would realise much more. The cost of cultivation in both cases is about £3 per acre, if labour is employed. Much of the grape crop fer 1899 was injured by frost, yet it totalled £3,230 627 lb. weight of grapes, which, calculating the value of the wine made from the wine grapes, has a total value of £46,000. Experiments are being carried on at the State farms with a view to establishing in Queensland oue or more of the Almeria varieties; if successful, a large export trade iu grapes to Canada and Great Britain wonld grow up. Experiments in currant growing and drying are being also carried on; the imports of currants into the State for 1899 were 1,636,185 lb., with a value of £13,646.

Some of the finest varieties of European wine grapes have been imported by the Department for propagation and distributiou, which should eventually materially assist in improving the quality of Queensland wiues. With regard to winemaking, we have a satisfactory proof that some of our vignerons appreciate the assistance given them by the Viticulturist, one winemaker having written to the Department to the effect that £500 a year had been put into his pocket by Mr. Rainford's services. Improvement in the qnality of table grapes and wine is evidene although in the latter case the result is obtained mort' slowly.

TOBACCO.

Since the last meeting of this Conference, an experiment farm for tobacco has been established at Texas, and 9½ acres of desirable leaf has been successfully grown, housed and cured. The varieties grown are those producing the favourite tobacco for the British and United States markets of the heavy pipe-smoking sorts. The results, so far, have been satisfactory. The industry is growing, and may be said to be in a fairly prosperous condition. White men are going more into the cultivation as they realise the value of the crop. New South Wales buyers have entered the market, and, if the product proves satisfactory to them, and there is every reason to believe it will, the future of the iudustry is most promising. It is to be regretted that an interest has not been manifested in cigar tobacco, as under federation, Sydney and Melbourne would give an outlet for considerable quantities and at a fair price. These tobaccos can be grown on mauy of the alluvial soils uorth of Brisbane, below the Range, the crop being suitable for both the large and the small farmer.

COFFEE.

In view of the great demand for coffee, and of the suitability of a large portiou of Queenslaud for its cultivation, nothing has been left undoue to place the coffee-growing industry on a sound basis, and to bring before the growers the latest and most effective methods of production. For years the Department scattered broadcast the best literature on the subject, and in 1899 appointed a most competent expert to give practical assistauce and instruction to the planters, with the result that at present coffee-growing, though not conducted on a very extensive scale or in all the localities adapted for it, is one of the most prosperous of our industries. So favourable, indeed, is our seaboard from Rockhamptou northward, so far as climate and soil are concerned, for the cultivation of coffee of the best kind, that Queensland within the next decade will be able to supply the coffee required for the whole population of the Australian Commonwealth.—*Queensland Agricultural Jounal*, June 1.

JAMAICA ORANGES.

The "Fruitman's Guide" of New York publishes the following interesting figures on the receipts of Jamaica oranges in that city from September to March:—

Month.			Boxes.
September	..	..	12,700
October	..	..	51,200
November	..	..	105,200
December	..	..	19,300
January	..	..	4,700
February	..	..	800—193,900

This amounts to over 530 carloads, and indicates that Jamaica is quite a factor in the orange market, in spite of the tariff. The crop was a light one this year and under normal conditions with a lower tariff the island could easily put one thousand or even two thousand carloads of oranges into New York. Naturally the California orange grower does not enthuse over any reciprocity treaty that will increase imports from Jamaica.—*Cal. Cultivator* in the *Hawiian Planters' Monthly* for June 1901.

ALOE: A NEW INDUSTRY IN SOUTH INDIA.

Sir,—It may interest your readers to know that a new planting industry is being opened up in our midst and one which may help the much distressed tea and coffee planters out of their

difficulties. I refer to Agave, or as it is commonly known Aloe, planting and the extracting of fibre therefrom on a commercial scale. A Syndicate has been formed in this Presidency under the designation of "The South Indian Fibre Syndicate" and the Manager has taken, on its behalf, for a period of years, all the aloe plants belonging to the Forest Department and the Local Fund Board along the various roads in the Anantapur District, in all perhaps some 300 miles. Probably, if all India were searched, no such extent of aloe hedging could be found, and therefore the concession is of priceless value to the Syndicate, for money could not purchase it in any other part of India, for it is simply not to be had. Further, it has secured through its Manager a grant of 20,000 acres of land for planting purposes. The Syndicate is now turning out fibre superior to anything that is produced by the Bahamas or Mexico, the two chief fibre-producing countries. I hear from a reliable source that a gentleman named Gribble has, on behalf of a Company at Home, offered to purchase the rights and property of the South Indian Fibre Syndicate for a sum of £60,000, and I should say, from all I hear, that the property is fully worth this or more to any Company in England with capital, and that they are getting a cheap bargain. I may mention that the fibre now being manufactured by the South Indian Fibre Syndicate has been reported upon by experts at Home as superior in every way to that received from other countries.

AGAVE.

—*Madras Mail*, Aug. 6.

PLANTING NOTES.

THE REPORT on the progress and condition of the Government Botanical Gardens, Saharanpur and Arnigadh, for the year ending 31st March 1901, shows that certain drugs—Colocynth fruit, Kamela powder and extract or dried leaves of Hyoscyamus—are given and supplied to the Indian Medical Department. Could this not be done in the same way in Ceylon? In regard to fruits and palms we quote :—

Seedling trees of the coarse stringy mangoes bore heavy crops in some of the groves in the district, but the crop carried by the choice grafted kinds grown in the garden was very light. Bers, figs, lichis, loquats, peaches, country pears and country plums were somewhat better in yield; but in no single instance was the crop sufficiently heavy to be classed as good. Oranges, limes, lemons, and grapes all gave very light crops, and so very light in the case of the lime that considerable difficulty was experienced in collecting sufficient seed to meet the wants of our nurseries for sowing purposes.

Arabian Date Palm (*Phœnix dactylifera*). —The date palms, with some few exceptions, are making excellent growth, but the yield of fruit is still insignificantly small. Fruit of excellent quality was produced by 17 trees, but the bunches were all too small to be of any value for market purposes. The trees which were noted in the last annual report as having been treated to a cart-load of manure apiece threw out a magnificent crop of leaves, but those which fruited did not bear larger bunches of fruit than trees which were not manured. The manured trees are however without question stronger and healthier-looking plants than those which have not been manured, and are almost sure to respond to the manuring given by yielding larger-sized bunches of fruit within the next year or two.

"THE WAX-PALM OF BRAZIL"—referred to by a correspondent the other day—is thus noticed in the "Treasury of Botany":—

The Carnaüba or Wax-Palm of Brazil, *C. cerifera*, grows about forty feet high, and has a trunk six or eight inches thick, composed of very hard wood, which is commonly employed in Brazil for building and other purposes, and is sometimes sent to this country and used for veneering. The upper part of the young stems, however, is soft, and yields a kind of sago; and the bitter fruits are eaten by the Indians. The young leaves are coated with wax, called carnauba wax, which is detached by shaking them, and then melted and run into cakes; it is harder than bees' wax, and has been used by Price and Co. for making candles, but, as no process of bleaching has been discovered, they retain the lemon-coloured tint of the raw wax. The leaves are also used for thatching, making hats, &c., and while young as fodder for horses. —A.S.

COCONUTS AND RICE IN THE SOUTHERN PROVINCE CEYLON.—Here is an interesting paragraph from Mr. Fowler's able Administration Report just received today:—

NEW AREAS OF CULTIVATION.—The extension of coconut cultivation progresses rapidly, and the sale of land affords a fairly correct index of the extent annually brought under cultivation. Tea planting is at a stand-still, and very little additional land has been planted with citronella. Most of the small lots are cultivated as gardens, and the total area of these is very considerable. A large extent of paddy land can be sold if the purchasers are allowed to buy under Sir Henry Ward's Minute, payment being made in four instalments, and I expect to be able shortly to submit applications. Mr Elliott has favoured me with some notes on his interesting experiment at Walawe, and it is pleasant to hear that experience has not affected his belief in paddy cultivation as a paying investment. He has found that working with hired labour, as on an estate upcountry, is impracticable. It is contrary to all Sinhalese traditions and customs. No reasonable wages would secure the services of the regular cultivators, and he could only get men who took no interest in their work. He then adopted the customary share system, and had then no difficulty in securing any number of the regular "goyas," and only the want of sufficient buffaloes has prevented him from securing a highly satisfactory return. Ploughs cannot be used on newly-opened land, and buffaloes, for which a high rate of hire must be paid, are indispensable. The area now under cultivation is nearly 500 acres, and the yield per acre was about 30 to 35 bushels His experience shows that, exclusive of cost of land, a sum of 6[illegible] cents represents the working expenses in producing a bushel of paddy, including European supervision. As the price of paddy varies from R1·33 to R1·56 per bushel, the return on a large acreage is sufficient to justify Mr. Elliott's faith in his enterprise, and it may be hoped that the time will come when European capital will be largely invested in the [illegible] acres that lie waiting under so many restored tank and channels. It is possible that in the Hambantota District cotton-planting may prove to be remunerative. On a circuit in that district in company with Mr. Broun, the Conservator of Forests, we found cotton growing apparently wild in the jungle and bearing freely. Mr. Broun took specimens of the pods which proved to be those of a cultivated variety gone wild. As the locality was far from any existing village of any importance, it must have been planted very many years ago, a proof that the soil and climate are congenial.

Correspondence.

To the Editor.

HOW TO CAPTURE THE UNITED STATES MARKET FOR THE TEAS OF INDIA AND CEYLON.

ADVERTISE—WIDELY AND BOLDLY.

MESSRS. P. C. LARKIN & CO.'S VIEWS.

Toronto, June 12th.

DEAR SIR,—We are enclosing herewith a copy of a letter which we have written to the *Home and Colonial Mail* of London, England, as we thought it might be of interest to your readers also.—Yours very truly,

P. C. LARKIN & CO.

(*To the Editor "the Home & Colonial Mail."*)

June 12th.

DEAR SIR,—I have been reading with a great deal of interest the many suggestions made by the friends of the tea trade, to bring that Industry into a better condition than it has been in of late. I read with special interest the letter signed "Ross W. Hayter," and agree with everything Mr. Hayter says. In the first place I believe that the only cure-all India and Ceylon can find is in the conversion of the hundred million pounds of Japan and China Tea, used in the United States annually, to the consumption of the products of India and Ceylon. That this is feasible is beyond question, and is best evidenced by the progress that has been made in the United States during the past six or seven years, for I consider that wonderful progress has been made for the amount of money that has been expended. Surely the newspaper writers, who occasionally give expression to their unsatisfied expectations, can know little of business, and less of this Continent, when they expect such wonderful results (as they apparently do) from the small efforts, in the shape of expenditure, that have been put forth by these two tea-growing countries. No sum less than Mr Hayter mentioned, viz.—forty or fifty thousand pounds sterling per year, and continued for at least five years, can have the effect of converting this Continent to the use of Indian and Ceylon Tea. And to put this into the hands of an inexperienced man, and allow him to purchase his experience on arrival here, would be a great waste. The money should be given to a man with a wide experience. To give you an idea of what amounts are expended by single firms, who exploit much more insignificant articles than tea, we might quote what is a well-known fact among advertisers; and it is that the Royal Baking Powder Co. spends in the United States and Canada five hundred thousand dollars, or one hundred thousand pounds sterling, annually in exploiting "Royal Baking Powder"; and they have done it consistently for years, and have found it most profitable. In our small way,

IN CANADA,

we spend and have for many years past, an average of twenty-five thousand dollars per year on newspaper advertising alone. In addition to this we expend large sums on sampling, showcards, street-car advertisements, demonstrations, etc., etc. Now, if we, in our small way, find this profitable (and the best evidence of the fact that we have found it so is that we are at it today, after nine years) how very much more profitable could the Planters of India find it, if they took the matter up in a whole-souled manner. Mr. Hayter suggests the collecting of one-sixteenth of a penny per pound on all exports from India, which would amount, roughly speaking, to about forty thousand pounds sterling per annum. This sum would be excellent, and, if continued for five years, would have a wonderful effect. But I venture to say that, if, instead of one-sixteenth, one-eighth of a penny was collected, the much desired state of affairs would be brought around much more quickly; for not only would the London market be—relieved of an enormous quantity of tea in a few years, but I believe that the advertising would greatly increase the consumption of tea per head per annum in the United States. The vast majority of teas sold in the United States today are poor teas, and to an amateur it seems the easiest thing in the world to convert the consumers of this poor stuff to become consumers of good teas; but Mr. Amateur has only to try it to be convinced that it is by no means an easy thing. Getting at the people of the United States is a most expensive process, and it has to be kept up for a number of years before the desired object can be achieved.

In conclusion, I can only say that I agree thoroughly with Mr. Hayter that India has had wonderful results for the amount expended. This continent consumes now close upon twenty million pounds of Indian and Ceylon black and green tea per annum, as a result of a few years' work and only a moderate amount of money expended. If it is desired to increase this five-fold, increase the amount five-fold. There is no "royal road" to it. There is only the every-day road travelled by many, who, when advertising was first suggested to them, said they could not afford it; but they soon found that they could still less afford to do without it, and that advertising made them rich, always providing they had a good article to offer the public.

I might mention that in Canada the Ceylon green tea is meeting with the most wonderful success, and in a very few years it will have driven out ten million pounds of Japan tea entirely. Now I have seen some of the most beautiful green tea, the product of Travancore; and therefore the Indian planters can supply both black and green tea to the United States. The deplorable condition of the Indian tea market, I think, calls for fresh, vigorous efforts to be made to exploit the great market of the United States.

The India planters must go whole-souledly into this matter, or else the results will be as they have been before; that is, "small expenditure and only comparatively good returns." If you were to ask a man, who has successfully exploited any article in the markets of the World, what he would do if he owned the entire tea product of India, I feel sure his answer would be.—"I would exploit the United States market by advertising."—Yours truly,

P. C. LARKIN.

FARMING AND STOCK IN TRINIDAD: OFFSPRING OF "CINGALESE" CATTLE,

Government Farm, Trinidad, June 13.

(*The Editor "Tropical Agriculturist."*)

Dear Sir,—May I ask you again to accept my Annual Report. I cannot say whether there is any matter of importance therein: simply that last year was successful, and that the department has been removed to much larger and superior ground and the work can therefore be widely extended.

The Cingalese bull has quite recovered from his broken leg and is as pugnacious as ever. Two calves have been born to him, altogether unlike the sire. They are marked like Alderneys, and I wonder whether these Cingalese are a distinctive breed or only dwarfed by inbreeding and environment. Every one is struck by the unsimilarity between sire and progeny. The bull was put to a well-bred red-poll heifer, first time. She produced a bull calf, a strong sturdy animal, but a nondescript showing no characteristics of either parent.—I am, yours truly,

C. W. MEADEN.

[We must ask Dr. Sturgess to give an opinion on the question raised by Mr. Meaden: we know of no records available to show how far back Sinhalese cattle have had their present distinctive characteristics. Mr. Meaden's Report is a very practical and satisfactory one, such as no doubt we shall be getting from the "Gangaroowa Farm" by and bye. We make a couple of extracts of local interest and application and showing the good work done:—

The chief occupation during the year has been the transfer of the Farm from St. Clair to St. Joseph. The latter place will in time become an ideal farm. There is an extensive range of first-class land for stock, well-watered and laid out for irrigation. The work of the farm can be widely extended to the evident advantage of the colony. A fine set of buildings are in the course of construction. In acquiring this property the Government will be in a position to produce the meat, as well as milk, for the Medical institutions at a great saving. I have shown above that 384 lb. of meat was produced at a cost of $4·80. This quantity at the present contract rate would cost $28 80. If there were sufficient stock on hand to fulfil the institutions' demand for beef, a clear saving of $7,000 per annum might be made in their expenditure. This is a question worthy of consideration, and whether it would not be advisable to spend a sum of money in the purchase of stock so that the supplying of beef might be speedily undertaken. This would not interfere with any private enterprise as all the money for beef practically goes out of the Colony. Another advantage to the Government would be that they would have a large reserve of cattle on hand in the event of a beef famine. Twice during the year, the Colony has had to face this though fortunately without great inconvenience. Quoting from the *Port-of-Spain Gazette* the following was stated—

"At present there is very little beef to be had, and on some days during the week the sales close as early as noon. The larger and more important proprietors can boast of having a few head of cattle in their pens, but this is not so with the smaller proprietors who have to go a scouring all over the country, with much inconvenience and with little and in some cases no success."

Although Trinidad may never be a pastoral country still she ought to be in a better position as regards her meat supply. An enterprising firm introduced a first consignment of cold storage meat with apparent success. This would fill a certain demand, but would be of little service to the poor or country districts.

Altogether the sale of stock during the year realized $3,727 60, and stock to the value of $1,396 was transferred to the Tobago Farm. This with the production of 132,000 quarts of milk and leaving live stock in hand to the value of $18,500, off about 150 acres of land, is, I respectfully submit, a record of a good year's work. A profit of 9·32 per cent was made upon the capital outlay.

At a time when "poultry" are under local notice, the following is of interest:—

Sale of poultry and eggs realized during the year £12 7s 3½d. The White Minorcas were disposed of. These fowls were unsuccessful: they laid a large number of fine eggs but generally they proved unfertile and any chickens produced died. The probability is that in a tropical climate their abundant egg-laying tended to weaken their fertility. The Silver Wyandottes have proved to be suited to the climate and soil and their introduction has been a success; they grow to a good size and lay well. Silver Dorkings were imported during the year and so far promise to make a useful addition to this branch of the Farm. Dorkings are well-known for their table qualities and their introduction will be useful.
Ed. *T.A.*]

THE REARING OF "HELOPELTIS ANTONII."

(*To the Editor of the "Tropical Agriculturist."*)

Salatiga, (Java), 7th July, 1901.

Dear Sir,—In reading the very interesting *Helopeltis antonii* sign., published in the *Tropical Agriculturist* of June, 1901, I was struck by the mention that Mr. Green was not able to rear up this insect from the egg to the adult. One year ago I also made some observations on *Helopeltis antonii* and I found that rearing up this insect is very easy, bringing up the freshly-hatched larvæ on young cacao pods, which are often renewed (every 1 or 2 days) and kept in closed glass-boxes. In doing so I could point out that the larvæ of *H. antonii* change their skin five times. The freshly-hatched larvæ are about 1 to 1·25 millimeter long, the processus of the sentellum is visible, but only 0·2 millimeter long, while nothing at all is to be seen from the wing rudiments. After the first moult the wings are indicated, the hind edges of the meso and metanotum projecting slightly behind. After the 2nd and 3rd moult these rudiments become bigger and bigger, so that, after the 4th, they extend themselves to the middle of the length of the abdomen; and with the 5th moult the insect acquires its perfect wings. As to

the duration of the different stages I noted the following data:—

Egg stage	.. ..	6 days
Until to the first moult	...	2 ,,
,, second ,,	...	1-2 ,,
,, third ,,	...	2 ,,
,, fourth ,,	...	2 ,,
,, fifth ,,	...	2-3 ,,
Total ...	... ...	15-17 days.

Not longer than two days after the insects were full-grown, they entered into copulation; and one day after copulation the females commenced egg-laying. Each female is able to lay about 30 eggs. In captivity I could conserve alive the adult insects during 4-6 days,—Yours very truly,

L. ZEHNTNER.

Salatiga, (Java), 7th July, (Cacao Experiment Station.)

[Mr. Green, to whom we showed the manuscript, thinks this a very interesting letter. He would like to know if the *Helopeltis* is found on tea in Java; and, if so, the experiment would be an interesting one to try if the tea insect thrived on cacao and *vice versa*. —ED. *T.A.*]

THE DEMAND FOR PLUMBAGO IN THE UNITED STATES.

Jersey City, N. J. (U.S.A.) June 19.

GENTLEMEN,—You will remember the writer as Vice President of the Dixon Crucible Company. We receive every week your *Ceylon Observer* paper and you have our order for your "Ceylon year book," the particular book that is to have a detailed account of all the plumbago pits.

The question was raised some time ago in one of your numbers, in the correspondence of Mr. Peto, which was followed by an editorial from you, as to the demand for plumbago ceasing in the United States, or if not ceasing, of its being very much less. The enclosed editorials, one called "Tricks in Crucible Steel Trade" and the other called "Crucible Steel's Hard Struggle" in the 'American Manufacturer and Iron World,' one of the leading trade papers in the United States, bears on this question and will speak for itself. The condition of affairs as described in these editorials is somewhat overdrawn; nevertheless, there is a good deal of truth in them. You need not return these articles as we have duplicates here, and we submit them to you as more or less evidence on a topic that is vital to the plumbago industry of Ceylon.—Yours respectfully,

JOHN A. WALKER, V.P.

[The articles are from the "American Manufacturer and Iron World" and we make a few extracts:—

A correspondent calls attention to one of the tricks in the crucible steel trade, that of substituting open-hearth steel for the product made in the crucible. . . . For many years the "American Manufacturer" with many other good publications have been calling attention to the advancement in the science of steel-making. Columns upon columns of reading matter has been offered on the subject of the substituting of open-hearth for crucible steel. Those who have been paying fancy prices for crucible steel, if there are any such, are probably those who will not subscribe for a technical or trade paper, believing they know all that is possible for them to know about their business. . . . It can scarcely be possible that many consumers of crucible steel have been buying open-hearth steel and paying the same price they paid for crucible steel. Right here it might be well to add that the purchase of steel by brand such as has been the practice for centuries is not in keeping with modern methods. Many manufacturers are paying two prices for material which can be had for far less money and will answer the same purpose. . . . The strong invasion of the field that was formerly held exclusively by crucible steel by high carbon open-hearth is even more serious to the crucible trade than the mere fact that competition may be so easily introduced in the crucible field itself. The makers of crucible steel employed open-hearth furnaces and much of that product went into the crucible market as genuine crucible steel. The character of high carbon open-hearth steel so closely approaches that of crucible that, except for special uses mentioned, the making of the very hardest tools, that consumers accepted the substitute without question. It might be strong to assert that the Crucible Steel Company will be compelled to make a fight for existence, but in the light of the development of the manufacture of open-hearth steel and the decline of crucible, except for those special uses referred to, probably the statement is not too strong. When the consumers of crucible steel become aware of how much open-hearth steel they are buying as crucible, there cannot but be severe changes in the crucible steel trade. The higher cost of making crucible as against open-hearth, will be another important feature of the competition. Not the least, however, will be the fact that the latest crucible, company will have new and modern plants with which to compete with the older and less economical plants of the crucible combination. The field for open-hearth steel is bound to expand rapidly and with the extension of its active territory will come the decline in crucible as was the case with the cruder and cheaper Bessemer product." [All this would seem to point to a lessened demand for plumbago for crucibles, ere long? —ED. *T.A.*]

THE CARNAHUBA PALM OF BRAZIL.

Hatton, July 27.

DEAR SIR,—I enclose a cutting from an old "Review of Reviews" on a rather wonderful sort of palm that grows in Brazil. Have you ever heard of it? Perhaps the tree would grow in Ceylon.—Yours faithfully,

H.

A MIRACULOUS PALM TREE which grows like a weed in Brazil, but the like of which is unknown in any other part of the world. It is the carnahuba palm. (*Copernicia ceriferi*), which grows uncultivated in the States of Parahiba, Ceara, Rio Grande do Norte, Piauhi, and some of the neighbouring States. The descriptions given of it to me seem incredible. Perhaps in no other region is a tree to be found that can be employed for such varied and useful purposes. It resists intense and protracted droughts, and is always green and vigorous. Its roots produce the same medicinal effects as sarasaparilla. Its stem affords strong, light fibres which acquire a beautiful lustre, and serves also for joists, rafters, and other building materials, as well

as for stakes for fences. From parts of the tree wine and vinegar are made. It yields also a saccharine substance, as well as a starch resembling sago. In periods of famine, caused by protracted droughts, the nutritious substances obtained from it are of immense benefit to the poorer classes. Its fruit is used for feeding cattle. The pulp has an agreeable taste; and the nut, which is oleaginous and emulsive, is sometimes used as a substitute for coffee. Of the wood of the stem musical instruments, water-tubes and pumps are made. The pith is an excellent substitute for cork. From the stem a white liquid, similar to the milk of the coconut, and a flour resembling maizena may be extracted. Of the straw, hats, baskets, brooms, and mats are made. A considerable quantity of this straw is shipped to Europe; and a part of it returns to Brazil manufactured into hats. The straw is also used for thatching houses. Moreover, salt is extracted from it, and likewise an alkali used in the manufacture of common soap. But from an industrial and commercial point of view, the most valuable product of the carnahuba tree is the wax obtained from its leaves.

[We do not find the name of this palm in Trimen's Guide to the Peradeniya Gardens; but it is very probably growing there and we think we noticed the description in the magazine at the time it appeared. At the same time, this palm is no more wonderful in the multifarious purposes to which it can be put than the coconut or palmyra with the hundred or more uses found for the fruit, leaves, fibre &c.—ED. *C.O.*]

THE TEA CESS AND THE TEA INDUSTRY.

August 1st.

SIR,—I want to put a searching question to your readers, *i.e.*, to Ceylon tea men generally: If there is a "Cess," who pays the Cess? Mr Ross W Hayter, writing to the "Home and Colonial Mail," advises a Cess of £45,000 and says:—"It may be said that the planter is not in a position to stand this 1·16th of a penny per pound. The question just occurs to me, Who would pay it? Would not the consumer pay it in the long run instead of the grower or exporter?" How is it that such a question *can* be asked by any business man? Is it not *evident* on the face of it that any article which is successfully advertised *pays* for the advertisement. Does anyone suspect for a moment the Ceylon planters are actually out of pocket—*i e*, *have paid* the Cess which they imposed on themselves? Can anyone say that the Ceylon Cess, if it had *not* been imposed, would have remained in the pockets of the producers? With that money you created a demand for *your* teas in America. Your tea is not as good as Indian tea and yet it has made more headway. Can you still doubt that the Cess was not paid by yourselves but by the consumer? Mr Larkin says that he not only dares to spend large sums in advertising but does not dare *not to advertise*. The only fault about your Cess is that it is not large enough. It ought to be ten times as large, so that you could not only advertise but *purchase* tea with which you could back up your advertisements. Mr Hayter's question is ridiculous. He should have put it as a statement. He knows well enough surely that planters do not *pay* the Cess. Seeing that he put it as an interrogation I am encouraged to put the same question; there may be a few tea owners who have not looked at the subject in its *obvious* light.

Let us look at what your owners promised. They promised to reduce the yield by four million pounds of tea. They knew that if they made this 4 millions they would get money for it at market rates, that is to say, 5 annas per pound—4 millions at 5 annas is equal to 1,250,000 rupees. A *few* of your owners promised to *give* 12 lakhs and fifty thousand rupees with the hope that this sacrifice would raise the prices of the remaining tea. The statement is so startling that it is worth while to work out the sum in full and leave no doubt of the figures. Four million pounds of tea would have been sold at the lowest rate at 5 annas per pound.

```
    4,000,000 lb
            5 annas
    ------------
16) 20,000,000 annas
    ------------
    1,250,000 rupees
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That is to say, these few owners promised nearly as much as the whole Cess at two pies per pound, which I advocate. Why should these owners *now* refuse to advocate the two-pie Cess? The promised reduction was about ten per cent., so we can conclude that the above owners make 40 million pounds of tea between them. 40 millions at two pies works out as follows:—

```
    40,000,000 lb
             2 pies
    ------------
12) 80,000,000 pies
    ------------
16)  6,666,666 annas
    ------------
     4,16,666 rupees
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This is less than *one-third of their former promise.* In the first case they would *have paid* 12 lakhs of rupees, because the simple reduction of 10 per cent from old markets would not be sufficient to raise prices. But in the second case, whatever is paid is paid by *all* equally, and there is tea ready wherewith new markets *can* be opened, and demand increased, and, after all is said and done, no one can refute the statement that the Cess would be *paid* by the consumers. What is it then that prevents the producer from demanding a big Cess? Let each man amongst you answer this question; some may know the *real* reason. And when once the obstacle is known it can be overcome.

A pony will not face a paper screen; he has to be shoved through it backwards; when the screen is torn the rest of the competitors gallop through without fear. The obstacle between us and the Cess is a paper screen, and it is to be feared that a great number of the runners in this race have longer ears than ponies. Who will tear the screen and let all through? I have been trying to show that there is open country beyond the screen. The producer fears that he will have to pay the Cess! The pony says "*Mon Dieu*, that wall will break my head!" Our Association do not wear spurs, and when the producer jibs he is allowed to stand, and the world is amused at the spectacle of our crowd jostled around the paper screen, and no race worth looking at. In "Indian Gardening and Planting," of July 25, an expert gives his views as to what should be done and asks the question, How is this to be done? The time for questions is over, let every man answer his own questions, let him say *this* should be and *must* be done. Producers *have* an object

in view, and it is absolutely ridiculous that they should be undecided as to their course, but human nature *en masse* requires a lead. However, some of your men took the lead and promised to reduce ten millions; let them now moderate the big Cess, and *force* it on by all means in their power. Were those promises false? Were they merely blinds to deceive others? If not, if they were "pukka," honest real promises to do *whatever* was required, let them now adopt some other course.

The Tea Industry had a promise of 12 lakhs of rupees from these men, and if they are asked to subscribe four lakhs is there any good reason why they should refuse? Remember that a "Cess" means that *all* shall pay equally and without fail, there will be no possibility of subterfuge, there can be no doubt that a certain sum will be available and that it will be sufficient for the purpose, and that it will be paid by our natural enemies, the buyers. We ourselves have allowed the buyers to become our enemies—we have forced them to be so, because we had no Cess, no system, no union of any sort, no common knowledge of the rulings of supply and demand, no common sense to foresee that supply would overtake demand unless we ourselves increased the demand by advertising, and *shoving* our tea into new places. I should like you to note that those who object to my scheme do not propose any alternative; they merely doubt the possibility of this, that, and the other thing. You remember about Cleopatra's Needle in Rome and how it was got up by the suggestion of one man out of ten thousand; he only said "throw water on the ropes!!" Well, then! I say to you:—Break down the paper screen. There will be long-eared ones who will shy at the broken screen, but "the Cess" will *force* them through.

A. C.

PLANTING NOTES.

THE CAOUTCHOUC export from New Caledonia reached in 1900 only 24,083 kilos. No rubber was exported in January last year.—*India Rubber Trades' Journal*, July 22.

THE CAMPHOR MONOPOLY.—The Vernacular papers report that the Japanese authorities contemplate the creation of a monopoly to cover the sale of the camphor manufactured in Japan outside of Formosa. The camphor industry in Japan has made great progress in recent years, and threatens to endanger the monopoly in Formosa. Mr Gato, the chief of the Formosan Administration Bureau, has framed a scheme for the restriction of the camphor industry in Japan, and recently laid the scheme before Government. It is understood that the camphor monopoly law will be put in operation in Japan in order that sufficient protection may be given to the industry in Formosa. The construction of an additional building to the Kobé branch of the Formosan Camphor Bureau at Ono, Hyogo, and the improvement of machinery and plant having been completed, operations for refining camphor will be commenced shortly. Three oil engines of 17, 5 and 3 horse-power have been fitted. The number of operatives has been gradually increased, and there are now fifty-three men and women employed, in addition to a technical expert. About twenty thousand pounds of camphor recently refined for trial was delivered to Messrs Samuel, Samuel and Co., who shipped it to India and Australia.—*Chemist and Druggist*, July 13.

PERUVIAN COCA, COCAINE, CINCHONA, &c.—The value of the coca leaves exported from Peru in 1899 was £17,359, against £22,437 in 1898; of cocaine, £67,097, against £65,197; of cochineal, £499, against £709; of borax, £61,102, against £57,422; of cinchona bark, £7,830, against £3,046. No weights are given for Peruvian exports as a whole, but they appear in relation to various centres. Thus, Salaverry exported 335 tons of coca leaves in 1900, and 214 tons in 1899, and 284 kilos of cocaine in the former year as well, this being the beginning of the alkaloid trade at this port. Most of the leaves were sent elsewhere in Peru, probably to be re-exported. Germany received direct 16,019 kilos of coca and 110 kilos of cocaine, whilst the United Kingdom received direct only sixty kilos of the latter. Mollendo sent to Liverpool in 1900, 48,575 kilos of bark; to London, 93,051 kilos of bark, and 670 kilos of coca leaves; to Hamburg, 32,962 kilos of bark, 212,922 kilos of coca leaves, 261 kilos of cocaine; to New York 138,569 kilos, of coca leaves, and 137 kilos of cocaine. The total export of bark was 183,549 kilos; of coca leaves, 352,161 kilos; of cocaine, 398 kilos. There was no sarsaparilla exported from Mollendo in 1900, but 35 kilos were exported the previous year. From Cuzco 617,150 lb of coca leaves were exported, the average price being 16s per drum of 25 lb in Cuzco. The shipments have gone principally to Hamburg via Mollendo, but some hundreds of pounds went to New York.—*British and Colonial Druggist*, July 12.

"IMPERIAL GARDENS FOR FRUIT-TREE DISSEMINATION THROUGHOUT THE EMPIRE."—Such is the title of a pamphlet by Dr. Bonavia, F.R.H.S, sent to us with the author's compliments, the six pages of which we shall have pleasure in reproducing in our *Tropical Agriculturist*. Dr. Bonavia is well known for his horticultural writings, and his monograph on the Citrus genus in two large volumes—one of them almost entirely diagrams—we frequently refer to. In the pamphlet under notice, he discusses bananas, guavas, mangoes, mangosteens and date palms, as well as oranges. The date palm ought to do well in the drier regions of Ceylon; but not better than the useful palmyra, a grove of which ought long ago to have extended from Jaffna to Anuradhapura. One remark of Dr. Bonavia we must notice: he says "Why they have not introduced it (the mangosteen) into Ceylon and cultivated it for commercial purposes is a mystery." Well, Dr. Bonavia should know that the mangosteen is not unknown in Ceylon. Both in Kalutara and Colombo on the moist warm South-West coast it grows and bears well in some gardens; but it is a very ticklish plant to deal with. We have half-a dozen times over got relays of healthy plants from a Kalutara friend to grow in a Colombo garden; but without being successful in growing a single tree—they take root and look very healthy for six months or so and then wither away and die down. We have at present two plants of a larger growth (which have cost us R5 each) and they are being sheltered from the sea-breeze and coddled as well as we know, in the hope of sturdy trees resulting. But evidently the mangosteen is far less easily cultivated commercially than either the mango or orange, in Ceylon.

THE EAST INDIA AND CEYLON TEA COMPANY, LTD.

THE REPORT OF THE DIRECTORS

for the year ended 30th November, 1900, to be presented at tbe meeting to be held in London on 8th instant, states that the amonnt at credit of tbe profit and loss account, after crediting the balance (£8,669) carried over in last year's accounts, is £10,459. From this the preference dividend to 31st May 1899, on account of season 1898-1899, absorhed £3,000; preference dividend final on acconnt of season ended 30th November, 1899, £3,000; interest on debentures for year ended 30th November, 1900, £1000; Mahaousa Factorv, amount written off, £701; deficit for the season 1899-1900, £2,911, leaving a balance at debit of profit and loss accouut of £152. The crop, exclnding that from Madampe, amonnted to 1,811,850 lh., as against 1,841,718 lb. the previous year. There was thus a small decrease from the older estates, and this reduction in yield is mainly attributahle to the severe hailstorm which was mentioned at the last annual meeting. The average sale price was 5·32d per lh. and the cost of production 5·77d. The yield of the Ceylon estates was satisfactory. The cbief cause of the diminished receipts of the Company is the reduction in the market price of tea. For Ceylon tea the average price fell ⅝d per lb. during the year and that of Sylhet 1¼d per lb. This heavy drop has undoubtedly been caused by over-production; however there is reason to hope that, with the contemplated reduction of output, prices will improve. The capital cost of Madampe estate, after crediting the value of its crop, stood on 30th Novemher last at £10,594. The Directors consider the hlock account sbould now be closed, and have every hope that this property will now make a profit. Its yield during the past year was 123,565 lb. and tbe latest estimate for the current season is 175,000 lb. When the serions position of the tea market and probable result of the year's working were seen, Mr Richardson, at the Directors' request, visited the Company's Indian estates, and at his recommendation it has been thought advisable to change the management of these properties, and considerahly rednce the expenditure. In order to replace tea injured by drougbt and hail in India, 75 acres of which have been abandoned, 70 acres of new land have heen planted out, and the cost of same has been all charged to revenue. If the rate of exchange ruling for the past season had been the same as that in the first year of the Company's existence, the result wonld have been £3,139 more favourable. The increase of duty by 50 per cent, that is, from 4d. to 6d., has undoubtedly curtailed the expansion of consumption, and, consequently, injurionsly affected the market. With reference to the Hopewell Tea Company, one-third of wbich belongs to this Company, calls to tbe amount of £5 per share have been made this year, making £9 per share paid up. Payment of this has been mainly met by withdrawing the deposit of £32,000 placed in anticipation of calls with that Company. Tbe properties are said to be in good order and coming on well, and it is reasonahle to hope that, with a better market for tea, the estates will sbow a substantial profit when tbey come into fnll hearing. With a view to manufacturing a better class of tea, the current season's crop estimates have been rednced by 107,400 lb. The total crop expected this season is now 866,600 lb. as compared with 529.934 lb. gathered during 1900.

EMPIRE OF INDIA AND CEYLON TEA COMPANY, LIMITED.

REPORT OF THE DIRECTORS

to be presented at the fifth annual ordinary general meeting, to be held on Thursday, the 4th July, 1901. The Directors have the pleasure to present to the shareholders their fifth annual report, with accounts made up to the 31st Dec. 1900:—

The following table shows the area of the Company's properties, and particulars of the land under tea:—

Group.	Name of Garden.	Tl. Area of Grants.	Total acres nnder tea.
Assam	Borjuli ...	2,518	1,985
do	Sonajuli ...	2,347	1,135
do	Namgaon ...	1,487	692
do	Daputa / Dhulapadong ...	3,910	461 / 791
Dooars	Good Hope ...	1,610	971
do	Hahaipatha ...	1,251	700
do	Dangua Jhar ...	260	235
do	Tasati ...	1,500	1,100
Ceylon	Lebanon ...	1,641	675
do	Knnckles ...	950	847
	Total ...	17,474	9,592

Capital expenditure on "Tasati" has ceased with the charge to block account in the present balance sheet. 1,100 acres have been opened out most economically in the last three years, and the work has been thoroughly well done.

CROP AND PRICES.—Alike in Assam, the Dooars and Ceylon, the gardens of the Company showed a satisfactory increase in crop in 1900 as compared with 1899, as will be seen by the foregoing tables. But the results of 1900 were unsatisfactory. This was partly due to the general fall in the price of tea, and to other causes which have injured the tea industry all round, but it was also partly the result of increased expenditure on all the gardens of the Company. Generally speaking, the local management deserved commendation for their successful efforts to improve cultivation, but the Board could have wished for a more strenuous effort to keep within the sanctioned expenditure. The average of the Bramapootra Valley of the Assam Province was 8·53 against the Company's average of 8·19 for its Assam gardens. The Dooars district secured 5.69, while the average for this Company's Dooars gardens was 6·32. In Ceylon this Company's gardens secured only 5·56 which price is below the rest of the district in which the Company's gardens lie.

DIRECTOR'S VISIT.—Mr Geo. Moore, a Director of this Company, has again spent several months in India during the past cold weather, and, while successfully promoting further measures to better the health of the labour force and improve cultivation, has done a very great deal towards introducing and enforcing economies which are of vital necessity in face of the present critical position of the Indian tea industry, owing to the heavy fall in prices. The Board, is, however, pressing for still further efforts at economy under all heads of charges except wages, a reduction of which is often the worst form of extravagance.

THE ANGLO-CEYLON AND GENERAL ESTATES COMPANY, LIMITED.

Annual Report.

The Directors herewith submit their Report and the Accounts for the year ending the 31st March, 1901.

The nett profit, with the balance of profit carried forward from the previous year, after debiting the Debenture Interest and placing £4,000 to Reserve, as shown in the audited accounts annexed hereto, amounts to £23,075 6s 7d., and the Directors recommend the payment thereout of a Dividend of Four per cent. on the Consolidated Stock of the Company, leaving a balance of £13,075 6s 7d. to be carried forward. The very unsettled outlook, and the disorganization of the market for tea, in view of the existing excessive supplies, make it necessary in the opinion of the Directors to carry forward a larger sum than usual. It is proposed to pay the Dividend on the 22nd July, 1901.

The year in Ceylon was generally favourable to the production of Tea; and the crop, which in the previous year amounted to 2,064,515 lb. from Estate leaf and 70,103 lb. from bought leaf, rose to 2,180,675 lb. and 133,672 lb. from Estate and bought leaf, respectively. The crop of Cocoa amounted to 2,285 cwts. as against 1,938 cwts. in the previous year. The gross price of the Company's Tea was equal to a price of 7·68 pence per lb. in the London market, as against 7·70 pence per lb. in the year 1899-1900. Thus, notwithstanding the general weakness of the tea market during part of the year, the price for the Company's tea was well maintained. The average price for Cocoa was 74/3 per cwt. as against 73/3 in the previous year.

In Mauritius, the crop of canes was in most places abundant, though drought affected the Beau Sejour Estate. In all, 3,106 tons of cane were handled on the Estates in which the Company is interested, and produced a crop of 8,565 tons of sugar, as against 10,723 tons in the year 1899-1900. This diminution is accounted for by the sale of Mon Songe, one of the estates of the Beau Sejour Company, in which this Company is interested, and by the fact that the crop of Mon Songe is no longer handled by this Company. The sale of the Mon Songe Estate enabled the Beau Sejour Company to pay off the mortgage of £30,105 11s 7d. due to this Company. The sales of, and realizations from, the Highlands and La Flora lands were continued, and the net proceeds have been applied to the reduction of the Mauritius assets.

The result of the working of the Estates in Ceylon and Mauritius respectively is given in the Profit and Loss Account, calculated at the average rate of exchange of 1/4¼, as against 1/4⅜ in the year 1899-1900.

The crop prospects of the current year, and the condition of the estates, both in Ceylon and Mauritius, are reported to be good. From Selangor, the reports of the progress made by the Rubber, Coconuts and other products are satisfactory. A statement of the Acreages is given in the schedule annexed hereto.

Mr. Henry Kerr Rutherford, under the provisions of the Articles of Association, retires from the Board, and, being eligible, offers himself for re-election.

The Auditors, Messrs. Welton, Jones & Co., also retire from office, and have expressed their readiness to act, if re-elected.

By Order of the Board,

Henry Greey,
Secretary.

24th June, 1901.

CEYLON TEA ESTATES.

Estates.	Districts.	Tea in bearing 1900/1901.	Tea not in bearing 1900/1901.	New Clearings planted 1900/1901.	Cardamoms.	Fuel Reserves and Nurseries.	Forest, Chena, &c.	Total Acreage.
Bellwood	Hewaheta, Lower	266	—	—	85	66	79	496
Craigie Lea	Dimbula	702	3	—	—	95	—	800
Dangkande	Matale, East	328	—	—	58	41	105	532
Darrawella	Dikoya	595	—	—	—	22	58	675
Delmar	Udapussellawa	855	36	—	—	60	392	1,343
Glendevon	Ditto	409	14	—	—	43	16	482
Loolecondera	Hewaheta, Lower	1,134	66	—	125	228	413	1,966
Nilloomally (3/4ths)	Kelebokka	390	20	3	83	45	213	754
Sinnapittia	Kaduganawa	335	—	—	—	80	341	756
St. Coombs	Dimbula, Upper	178	7	—	—	—	231	416
Stellenberg	Pussellawa	497	18	—	—	—	74	589
Wattawella	Dikoya, Lower	314	30	—	—	18	390	752
		6,003	194	3	351	698	2,312	9,561

CEYLON COCOA AND COCONUT ESTATES.

Dumbara District.

Estates.	Cocoa in bearing interplanted with Coconuts not in bearing.	Cocoa not in bearing.	Sundries.	Fuel Reserves, Grass, &c.	Forest, Chena, &c.	Total Acreage.
Kondesalle	579	10	33	238	20	880
Mahaberiatenne	473	—	19	125	645	1,262
	1,052	10	52	363	665	2,142

SELANGOR COFFEE ESTATE.

Estate.	District.	Coffee not in bearing interplanted with Coconuts and Rubber.	Coconuts and Rubber.	Forest, Chena, &c.	Total Acreage.
Bukit Rajah	Klang	490	95	616	1,201

MAURITIUS ESTATES.

Estates.	Under Cane.	Cane lands under rotation.	Other lands.	Total Acreage.
Britannia ..	1,599	101	807	2,507
Cent. Gaulettes ..	898	—	865	1,763
Estates in which the Company is interested:—				
Beau Sejour Sugar Estates, Co. ..	1,274	962	295	2,531
Bon Air ...	462	32	123	617
Highlands ...	—	—	172	172
La Flora ...	—	—	268	268

TROUT CULTURE IN NATAL.

Pietermaritzburg, June 18.

A meeting of gentlemen interested in angling met at the Natal Club yesterday to form an angling association. Mr Cecil Yonge took the chair, and there were present 25 anglers. The Chairman gave a sketch of the efforts made to introduce trout into the Colony, and said results showed that a penny spent in Natal in trout culture was equal to a pound spent in any other country. Mr J C Barker proposed that the objects of the association should be to obtain fishing rights on the rivers of Natal, to preserve and regulate the capture of fish. Mr R J Harrison said that land owners would see that it was to their advantage to have their rivers fished. The Chairman said that, although the Attorney-General had given the opinion that the Government and the public had no rights over the landowner, in future the Government in putting trout in should have a right over them. He questioned whether the landowners would or could decline to assist the anglers. —*Natal Mercry*

SNAKES' SKINS AND MILLINERY.

At a recent meeting of the Bombay Natural History Society a suggestion was made for the utilisation of snakes' sloughs or discarded skins. Mr. E L Barton exhibited a number of pieces of the slough cast by the large python in the Society's rooms, mounted on different materials, with a view of ascertaining what use, if any, these sloughs might be put to. The specimens mounted on bright-coloured calicoes, especially green, were by far the most successful, and the concensus of expert opinion appeared to be that, from a millinery point of view, the sloughs might be used with advantage for the purpose of trimming hats !—*Madras Mail.*

THE CONSUMPTION OF COFFEE.

One-half of the world's production of coffee berries is brought to the United States. Americans are the greatest coffee drinkers on the face of the globe now, and every year the consumption of coffee is increasing here. Last year it was more than 80,000,000 pounds for the whole country, or more than 10½ pounds a head of the population. Germany and France together only consumed half as much coffee. Germany less than 6¼ pounds a head and France only 4½ pounds per capita. The United Kingdom used little more than half a pound of the berries per head of the population, but over there they made up for it by drinking more tea than any other nation. More than a million dollars is sent out of the United States every week in payment for coffee. South and Central American countries, which supply us with more than 6,000,000 pounds of coffee a year, get most of the money Porto Rico, Java and the Philippines get almost all the rest, but a little goes to Hawaii. Last year the total value of the coffee imported into the United States was about $60,000,000, and that was less than for several years, because the import price of coffee has fallen about one-half.—*Bradstreet's.*

RUBBER.

ACCORDING TO THE CONSULS.

The exports of rubber from Sierra Leone in 1900 amounted to £3,406 to Germany, and £22,335 to Great Britain. In Cochin China the Government is patronising the cultivation of the gutta-percha tree, and planting is now being tried in various parts, chiefly in Laos, also in Annam and Tonkin. In Indo-China the exports of gutta-percha for 1900 amounted to 339,000 kilos, against 52,813 kilos in 1899. Gutta-percha comes chiefly from Annam and Laos. A picul of good quality is worth about £13.—*India Rubber Trades' Journal*, July 22.

COFFEE AND TEA IN THE UNITED STATES. —Quite a number of publicists among our American cousins have gone "a wee bit daft" over the idea that coffee as well as tea can be successfully and profitably grown within the bounds of the vast western Republic. The talk about coffee-growing is the subject of amusing comment by our Brazilian contemporaries, of which the paragraph we quote today from the *Brazilian Review* is a specimen; and now we have a long article on "American Tea Growers" in the *Florida Agriculturist* from which we take an opening paragraph:—

Ere the present cycle of a hundred years is rounded out, Uncle Sam will, in all probability, be producing within his domain sufficient tea leaves for all the soothing beverage which his people can possibly drink, and mayhap will have some to spare for his brethren across the sea.

That this will be a highly desirable consummation must be appreciated even by the person who never sipped a cup of tea in his life. For one thing, it will enable the poorer classes to obtain good tea at lower prices, and for another it will keep in the coffers of the American people a fortune, amounting to many million dollars annually, which now goes to feed and clothe men and women on the other side of the globe. Under present conditions every man, woman and child in the United States consumes about twenty cents' worth of tea each twelve months, and the immense aggregate sum is divided between the tea growers in China, Japan and Ceylon, several middlemen and agents, and the vessel owners who carry the precious product to market.

The best feature of the new era which is coming, however, is found in the fact that finer tea can be grown in the United States than in the Orient. This has been conclusively proven by some interesting experiments which the United States Department of Agriculture has been conducting during the past few years at the pioneer tea plantation established in the New World.

All this "high-falutin" is based on the fact that Dr. Shepard has produced some few thousands of pounds from his tea garden in South Carolina which he can sell at a dollar per lb; while the very finest "Darjeeling" or choicest high-grown Ceylon can be imported and sold for half-a-dollar a lb. As to fineness, delicacy and flavour, it is not likely the two kinds we speak of can be excelled. With labour in India and Ceylon costing from one-sixth to one-tenth what it does in the States, it is not likely any great Tea Industry can be profitably developed in the latter. A few gardens as novelties may succeed, so long as people like to pay a fancy price from patriotic or such-like feelings.

THE VETERINARY SURGEON'S REPORT FOR 1900.

It cannot be said of many Administration Reports that the bulk of them provide reading matter of universal interest; but an exception to this general rule must be found in the Veterinary Report of Mr. Sturgess, M.R.C.V.S., presented by itself this year for the first time and which came into our hands yesterday. Considering that the writer was engaged in special work in connection with conveyance of the C.M.I. horses to South Africa and an examination of the treatment and conditions of rinderpest there—the Ceylon Government thus killing two birds (but no horses!) with one missile—we congratulate him the more on the full and clear statement he has given for 1900. As the records available have hitherto been more than meagre, it is satisfactory to find that Mr. Sturgess's systematic efforts to render these annually more complete have met with a fair measure of success during the year under review. And now that the importance of his work is coming to be officially recognised, no obstacle should be placed in the way of his thorough supervision of the scientific duties of his staff in the shape of necessitated personal attention to a quantity of clerical work which might be undertaken by less skilled hands. A mere perusal of the Government circular (given elsewhere with extracts we quote from the Report) will indicate the proportions to which this labour has attained.

Rinderpest and inoculation are, of course, the two principal topics of which Mr. Sturgess treats, the usual visits to Delft and Iranativu having nothing of exceptional interest, except the curing of Iranativu ponies of internal trouble during the October visit. Rinderpest, we learn, has been worst in the three thickliest populated provinces—Western, Central and Sabaragamuwa. The cause of its spreading, when an outbreak occurs, is generally found to be the fact that the animal (the disease usually occurring in a town or some way from home) is hurried back to the estate and this infects a perfectly free place. In introducing reforms among a people where so personal a property as cattle is reared and kept under the shadow of many superstitions and popular prejudices, a trained western officer will not find his route one that facilitates unimpeded marching. So original a people as the Sinhalese will not be *driven* into doing what the white doctor tells him and ancient custom has to be won by persuasion, by the persuasive force of success in treatment and in their neighbours' adherence to new rules—not conquered by the overriding weight of official order or decree. In following Mr. Sturgess's remarks on native methods, we are pleased to read between the lines how appreciatively he grasps the native ways and mind and recognises what perhaps Tennyson meant when he said:—

> Science moves but slowly, slowly,
> Creeping on from point to point.

On the subject of inoculation Mr. Sturgess has much of interest to say and for experts his remarks on the various methods of inoculation are of high interest. For practical purposes, however, we quote details of only the Cape Colony method, which is to be followed in Ceylon. Passing over the subjects of the staff, returns of stock imported, foot-and-mouth diseases, and classes at the School of Agriculture, we come to the Government Dairy and the Improvement of Native Cattle.

Mr. Sturgess thinks that the want of good cattle and absence of native effort to improve their stock is partly due to the fact that Ceylon does not possess a meat-eating population and partly because the native cannot (or will not, in some cases?) afford to feed his cattle better, the better the cattle the more being the food required. The plan pursued at present, of sending the best bull-calves from the Government Dairy, throughout the island, wherever applied for by the Government Agent of a province, is likely to prove a first step towards extending a desire among the natives to devote more attention to their cattle. In due time, perhaps, they will come to exercise greater care over their herds, alter the breeding methods (or want of method!) in vogue and generally raise the quality of the stock, to the increased welfare and prosperity, agricultural and otherwise, of the population generally. Next to the promotion of staple agricultural industries—in cereals, palms, vegetables, &c.—there is nothing so important in respect of native interests, as the maintenance of healthy herds of live stock and the improvement of the same. The best guarantee that such a course is being opened out with all judicious rapidity is to be found in the fact that it is under the immediate charge of a gentleman of Mr. Sturgess's experience and keenness in his work, admirable sympathy with deep-rooted custom and recognition that the pace cannot be forced where the immemorial ways of an ancient people are concerned. On the one side of the District and Provincial Revenue Officers, Mr. Sturgess has as notable work to do as have Dr. Willis and his Scientific Staff on the other.

VETERINARY WORK IN CEYLON.

(Extracts from the Report of the Government Veterinary Surgeon for 1900.)

I have the honour to present my report for the year 1900. Early in January my services were placed at the disposal of the Commandant, Ceylon Volunteers, in connection with the despatch of the Ceylon Contingent of Mounted Infantry

TO SOUTH AFRICA.

I left for South Africa on 24th February with seventy-five horses, reaching Capetown on the evening of 16th March. The horses were all safely landed on the 18th in good condition. I was on duty with the horses until 9th April, when I returned to Capetown and commenced the investigation of the methods employed in South Africa in dealing with rinderpest, as directed by His Excellency the Governor before my departure from Ceylon. After presenting my letters to the Government of Cape Colony, I was referred to

the Minister of Agriculture and the Principal Veterinary Surgeon, Mr Hutcheon, who kindly assisted me in every way he could, and whose office I attended during my stay in the Colony, collecting all the information possible, which was presented to Government on my return to Colombo on 8th July. Dr. Turner, the Principal Medical Officer, also gave me great assistance and copies of his reports upon the subject.

On my return rinderpest was prevailing in the Kegalla and Ratnapura Districts, and I visited Badalgama, Katukinda Dehiowita, Yatiyantota, and Ruanwella and surrounding villages, leaving Stock Inspectors to carry out the measures advised for the suppression of the disease. On the 25th July I left Colombo for

DELFT AND IRANATIVU

to inspect and carry out the necessary work in connection with the horses there. On Delft the mares and foals, about seventy in number, were put into the kraal and examined one by one, all being found healthy. From Delft I went on to Iranativu, where the young growing stock are kept. The ponies, forty-eight in number, were examined, and fifteen colts caught and operated upon on 30th July and 1st August, all successfully. None of them had to be caught again and were not dressed in any way after operation. In October reports reached Colombo of disease amongst the ponies on Iranativu, which I left perfectly healthy the first week in August. I again left for the Island on the 17th October in company with the Government Agent, Northern Province. I discovered after considerable trouble it was due to internal parasites in the shape of "thread worms," and all the ponies were caught and warm medicines administered. There was no further loss. Up to the time of our visit six had died, and the cause had been wrapped in obscurity, as there was no one to observe and give an intelligent account of the symptoms when a pony fell ill, and the animal was dead long before the report reached Jaffna from the island, and from Jaffna to Colombo. The disease is referred to under the name of "Helminthiasis."

THE OFFICE WORK AND GENERAL CORRESPONDENCE

has greatly increased during the year. Information relating to various cattle diseases has been given whenever applied for. Before leaving for South Africa I prepared a special paper on Rinderpest for the Planters' Association of Ceylon, which has been circulated amongst the members. During the year a circular was issued by Government making the following rules :—

(1) That Government Agents do impress on headmen the necessity of promptly reporting every outbreak, or hold them responsible for failure to do so.

(2) On receipt of intimation of an outbreak, Government Agents are to at once report the matter by wire to the Colonial Secretary and to the Veterinary Surgeon direct.

(3) So long as an outbreak lasts, weekly reports are to be furnished to the Colonial Secretary by them.

(4) The Veterinary Surgeon is, on being communicated with by the Government Agent, to take necessary steps and report to the Colonial Secretary action taken by him.

(5) He is also to furnish a list weekly, showing all the localities in the Island where the disease prevails, and extent of the outbreak in each case.

(6) Further, he is to furnish a monthly report showing what has been done by each member of his staff during the preceding month.

These rules have been regularly observed, with great benefit. It will be seen that considerable clerical work is entailed, which principally falls upon me, as I have only the assistance of the Stock Inspectors, who are very often away from Colombo.

RINDERPEST.

During the year the Western, Central, and Sabaragamuwa Provinces have been most affected. Small outbreaks occurred in the Central, Southern, and Uva Provinces. All the outbreaks have been sporadic and not epidemic, and have principally been on the line of main roads caused by cart bulls spreading the disease from place to place.

Much is written and said about the losses due to rinderpest and other cattle disease. No doubt serious loss does occur, and is due to various causes, amongst which carelessness, prejudice, and apathy occupy a prominent place. The first few cases are not reported or isolated in the majority of cases, and infection is spread from one village to another because the cattle from adjacent villages mingle and graze together. In some cases the disease is not known, and so it goes on until a firm hold has been gained. Villagers are, as a rule, very conservative, and object to the new-fangled European interference. There is also deep-rooted superstition to deal with, as they think the disease is due to the anger of some supernatural being, and if they endeavour to check it some evil will fall upon themselves, or they fear that some measure may be ordered by Government which will give them a little trouble and so try as well as they can to conceal cases. My aim has been to meet their prejudices and objections half way, and explain what I wanted to do and the reason for it. So far we have worked smoothly, and the methods of treatment have been steadily gaining ground, slowly perhaps, but changes against deep-rooted beliefs and custom have to be gradually effected everywhere. In several villages when I first suggested inoculation the greatest fear and reluctance was shown, and only one or perhaps two cattle could I obtain for inoculation, and only these to satisfy what I am quite sure was regarded as a mad freak on my part. Afterwards, when it was found the cattle did not die or evil happen to them, owners would perhaps allow a few more to be done, and so more and more would be brought. Another thing to be considered is the

QUALITY AND STAMINA OF THE CATTLE

in the villages. Hundreds of semi-wild cattle (I am not referring to working bulls on estates in any way) are kept by village owners for apparently no purpose whatever. They are not milked or fattened for food, not fed or housed, and perhaps only seen once or twice a year. They are allowed to wander about, often in drought time, miles from their owner's home ; they breed "in and in" and degenerate until they are no larger than good-sized sheep dogs. If disease appears, as it often does amongst these miserable rats of cattle, no one looks after them ; half of them die, and a report comes of the alarming prevalence of murrain in a district, and the Government Veterinary Department is expected to put things straight by a few days' stay in the place, or by the enforcement, as people call it, of some imaginary regulations, but which they are

unable to frame or even suggest in practicable shape. The regulations, if I suggested, would be to compel owners to feed and take better care of their cattle or else not to keep any at all. In reading "A Naturalist on the Prowl" by "Eha," I was much interested in the following passage, which I cannot do better than quote in full, as it exactly expresses what I mean. It occurs, I think, in the description of an Indian morning :—

"Then a slow procession of spectral cattle will come upon the scene—gaunt frames of bullocks and cows and calves, with scabby hide drawn tight over sharp bones, lustrous eyes staring wantingly, and prematurely-grown, distorted horns. And they will greedily feed on what the bats have dropped. Poor things! The wide world seems to have no food to spare for them. The ground is bare of grass and the shrubs are bare of leaves as far as their famished tongues can reach. They belong to somebody, of course; a farmer somewhere calls them his. But he does not feed them. Why should he? He does not need them just now. In due time the rain will come and the grass will grow and keep them alive until ploughing time. Then, if well beaten, they will put forth all the strength needed to pull his little crooked plough through the muddy rice ground. If the lives of some of them flicker out before that, his loss will be small and his conscience will be free. If he lifted his own hand to shorten their lives the waters of the Ganges could not purge away his sin."

There is also the question of reporting cases. The disease may exist for days and weeks in a village before the headman hears of it, and then in some cases it is not reported quite as soon as it should be. As a general rule, however, headmen do report as soon as they hear of an outbreak; one cannot put blame on a class for the negligences of a few individuals. This is the crux of the whole question. If the first few cases were reported at once, and destroyed if necessary, there would not be much difficulty in dealing with an ordinary sporadic outbreak as is usual in this country.

INOCULATION.

The great preventive measures are the methods of inoculation discovered and worked out during the South African outbreak, and which gave the very excellent results most people have heard all about. But the conditions of life under which cattle are kept in the East generally render such results almost impossible. The conditions are in every way different from those under which European and South African cattle are kept; the numbers, too, are immense, as will be seen from the returns of each Province. Almost every man endeavours to keep his trotting bull for travelling purposes, and a few semi-wild cattle running in the jungle as well; there are no good pastures; no enclosed farms; the cattle of one village mix freely with those of the adjoining village in the jungle, and are only recognizable by their brand. The effects of inoculation are temporary, and pass off in a few months. There are several methods of inoculation discovered during the epidemic in South Africa, after a great deal of research and expense, and which are of great value.

The method of inoculation advised in sporadic outbreaks by Mr. Hutcheon, Principal Veterinary Surgeon in Cape Colony, is as follows, and is the method I intend to follow as far as possible, as I consider it most suitable and practicable in this country :—

For Infected Herds—These should be inoculated at once with either serum or glycerinated bile; every animal which indicates infection by a rise of temperature should receive a large dose of not less than 100 c c* of serum or 30 c c of glycerinated bile. The latter should by preference be injected into the jugular vein, so as to secure its immediate action. Then from eight to twelve days after all the animals in the herd which give no indication of being infected with the disease or fever temperature should receive an injection of pure bile, not less than 10 c c, and for large animals 20 c c. This will confer a lasting immunity sufficient for all practical purposes.

Clean Herds—When it is decided to inoculate a clean herd, which is in danger of becoming infected through its proximity to diseased cattle, I would recommend that the animals composing the herd should be inoculated first with 20 c of glycerinated bile, and to follow this inoculation in from eight to twelve days with an injection of from 10 to 20 c c of pure bile. This will confer a strong and lasting immunity on the animals in the herd, and will be free from risk arising from the inoculation or of introducing the disease.

When I came to the country in 1895 there were no records at all, in fact very little information of any kind available. I stood alone, and had to find all out for myself. I drew up a form in the manner in which I wanted the information, and it was not until 1897 that returns came in anything like a complete manner, and since their publication attention has been drawn to the amount of disease.

The following shows the number of cattle and the deaths in each of the Provinces for 1900 from all diseases as shown in the complete returns annexed:—

Province.	Number of Cattle.	Deaths.
Western	173,371	2,109
Central	102,214	1,514
Northern	214,213	—
North-Western	293,979	7,246
Eastern	76,499	50
North-Central	117,107	661
Uva	66,189	2,137
Sabaragamuwa	85,237	1,541
Southern	179,167	1,523
Total	1,307,976	16,781

giving a percentage of 1·28 deaths from all diseases.

STAFF.

The Assistant Veterinary Surgeon, Mr. Hoole, came to Colombo from Anuradhapura in January to assist me, as I was busy purchasing and examining horses for the Contingent. On my departure to South Africa in February he acted for me with great success and earned the thanks of Government. I took over charge again early in July, but as there were outbreaks of rinderpest frequently occurring in the Western Province, and I was likely to be away a good deal, he stayed on in Colombo until the end of the year, when I proposed to effect a fresh arrangement of staff consequent upon the appointment of additional Stock Inspectors. From 1st January he takes up his residence at Kandy, as a permanent station, for work in the Central Province.

At the time of writing this report the arrangement of the [rest of the] staff is as follows :—

STOCK INSPECTORS.—D L Dias, Anuradhapura; T Mahamooth, Jaffna ; A M Fernando, M D S Wijanayaka, E W Jayatilaka, Colombo ; Messrs. Fernando and Wijanayaka go out shortly—one to Kurunegala and the other to Ratnapura—for work in the North-Western and Sabaragamuwa Provinces. In this way the Central, Northern, and North-Central Provinces have been provided with assistance, and shortly the North-Western and Sabaragamuwa Provinces will be provided, and the others in turn. The inspectors work in the Provinces under the direct orders of the Government Agent, subject to my general control and advice.

RETURN OF HORSES, CATTLE, AND SHEEP IMPORTED DURING 1900.

Port.		Horses.	Cattle.	Sheep and Goats.
Colombo	..	534	26,535	96,329
Mannar	..	—	5	3
Jaffna	..	15	3,793	5,865
Galle	...	—	—	—
Trincomalee	..	—	—	61

GOVERNMENT DAIRY.

Daily visits are usually paid when in Colombo. The health of the stock has been excellent during the year. There has only been two deaths—one cow and one calf—out of a total of 114 cows and 79 calves and seven bulls, a total of 200 cattle. In November and December a disease appeared amongst the larger calves ; there were fourteen cases, and all recovered. The disease is specially referred to later on in this report. When I first came out I found the yearly losses of calves was very great, and there were a number of very weak calves on hand. Thirty-four died during my first year. Since then there has been very few losses, which shows, I think, that the changes suggested in their management and the preventive measures adopted have met with some success.

IMPROVEMENT OF NATIVE CATTLE.

Some time ago the question of the improvement of the native cattle by the importation of stud bulls from India was under consideration by Government, and I drew up regulations for their management and service. On going into the question thoroughly it was found rather impracticable, and I suggested the sale of a number of calves from the Government Dairy in each Province in turn. This was not very successful, as it was found that the calves made more money in Colombo, and principally native estate owners purchased them at the dairy sales and sent them out to their estates in the country. This plan, however, did not reach the small village owner, who could not afford to buy expensive calves, and I suggested that six of the best bull-calves bred at the Government Dairy should be specially selected and retained each year for distribution to the different Provinces, being sent as applied for by the Government Agents. This was sanctioned, and is being carried out successfully, I believe, so far. Six have gone to the Northern Province and two bulls are on Iranativu island where the native owners have got rid of all their native bulls and are breeding from them only. During the year three have been sent to Ratnapura, two to Kegalla, and one Anuradhapura. Beyond a few European and native estate owners, there is no real attempt at breeding good cattle in Ceylon. Indeed, it would be pretty difficult to improve the breed by importing good bulls unless good pasture is provided, and I do not yet know of any pasture lands worth the name, although I believe they could be made under good management. Under proper care and good feeding the native bull is a strong, capable little fellow, well adapted for the work which his owner requires of him, and he would be considerably bigger and stronger and better in every way if taken care of when young. There is any amount of fresh blood being brought into the Island year by year from Great Britain, India, and Australia, principally by planters, which should give to the native cattle all the fresh blood necessary for their improvement, besides the calves bred at the Government Diary, of which an average of thirty to forty are sold every year. I once asked in a village if they would like a good stud bull sent to their district. The spokesman of the group, an old man, said "No, they did not want one, because if they bred better stock they would want more feeding, and they could not afford that, as they could hardly get rice themselves ; their own cattle kept themselves mostly and required very little feeding. My advice to most cattle owners here is, Keep fewer cattle and feed them better ; breed only from the best, and the cattle will improve. Take an average estate where cattle disease breaks out, and what is found ? I generally find three or four hundred cattle kept solely for the purpose of manuring coconut trees ; they are tied in groups round each tree in turn and manage to exist upon the poor and scanty herbage afforded ; no food is given ; the animals are lean and hungry ; a newly-calved cow has not sufficient milk to raise her calf. What is the use of putting a good bull on the place under circumstances like this unless there is better management to follow, and unless there is some demand for good stock when reared ? With a meat-eating population this would soon change and good fat stock would be produced to meet the demand for food. It must be understood that these remarks are general.

RUBBER FROM A MEXICAN PLANTATION.

The San Francisco *News Letter*, in its issue of June 15, 1901, said :—"La Zacualpa Rubber Plantation Co., on June 1, brought to this city 1050 pounds of clean, crude rubber. This is the first shipment of this year's crop, the largest single shipment received at this port, and the first from a cultivated plantation. The shipment is on exhibition this week at the plantation's general offices, Nos. 703-4, Claus Spreckel's building. This exhibit is of interest, as it enables the Zacualpa company to declare itself the only company in the United States which has produced rubber to show to its investors. The Zacualpa company is shipping to London 30,000 pounds of rubber yearly, but the Bowers Rubber Co., which bought up the present shipment, is competing strongly with other local firms for more. This rubber is so pure as to delight the hearts of dealers. The Zacualpa company now has a plantation of 725,000 rubber trees. Their plantation is situated on the Pacific coast within the department of Soconusco, Mexico. Mr. J W Butler is president and managing director, and Mr. E Noel secretary. The economical management of the company, together with its superior product, makes it a gilt-edged proposition for investors."—*India Rubber World*, July 1.

A "CORNER" IN OPIUM.

WEATHER AIDS THE SMART AMERICAN SPECULATORS.

Even opium has not evaded the commercial octopus of America. English opium-eaters are now threatened with a corner in their favourite drug,

for American speculators have bought up the available supply, and prices are already on the rise. London opium importers have received advices from Smyrna, saying that rain has hurt the Turkish crop greatly and that, before the destructive storms, American brokers bought 79,400lb. of opium, thus securing the visible supply. The highest grade of the drug is grown in Turkey, and England usually takes about half-a-million pounds. Owing to the damage to the new crop the Americans can ask their own rates, and already prices have gone up 9d. a pound in London, with every prospect of a much greater advance. A leading opium importer said recently that the Americans had acted very cleverly in cornering opium. Only a light crop was planted last year, and this fact, coupled with the weather, increased the certainty of a shortage. Usually there is too much opium for it to be cornered, but this year conditions favour the Yankees.—*Express*, July 25.

TIMBER SLEEPERS ON INDIAN RAILWAYS.

The substitution of metal for wooden sleepers in Indian Railway construction owes its origin not merely to comparative life and cost of each article, but as much to the important factor of supplies in the past not being equal to demands. In the early days India was dependent on Europe for her creosoted Pine sleepers, a trade which is, we believe, now about extinct with the general adoption of cast-iron and steel sleepers, and a more abundant supply of Indian timber sleepers, as well as Jarrah sleepers from Australia. The Bengal Timber Trading Company, Limited, Managing Agents, Messrs. Jardine, Skinner and Company, Calcutta, we would remind Railway and other Administrations, are in a position to supply first-class Sal, Jarrah and Teak sleepers, also Teak and Pine timber, in all sizes and in large quantities, at favourable rates.—*Railways*, Aug. 7.

CITRONELLA OIL,

BY ERNEST J. PARRY, B.SC., F.I.C.

Apart from general analysis of oil of citronella, with a view to determining its purity, the great bulk of the oil on the London market is examined in order that it may be certified as passing the so-called "Schimmel's test." Pure oils of commerce give somewhat different results with this test, some being quite soluble in 80-per cent alcohol, and others, although quite soluble in 3 or 4 volumes of the alcohol, become slightly turbid on addition of 10 volumes of the solvent. Occasionally one has to decide as to what constitutes "slight turbidity" in this respect. In general I find that the citronella oils (that is the pure oils), with low sp. gr. are those which give a perfectly clear solution, whilst those with a high sp. gr. often give a slight turbidity when the full 10 volumes of alcohol are added. In cases where any possible doubt can arise as to what is the limit that this turbity may assume, without the oil failing to pass the test, the use of alcohol of slightly higher strength will be found of se vice. With pure oils the turbidity almost, if not quite, disappears when the alcohol is increased to 81-83 per cent, whilst, if even very small quantities of petroleum are present, there is practically no change by using alcohol up to 85-per-cent strength. It has been shown that the high gravity oils usually contain more methyl-eugenol than the low gravity samples; but this would not account for the lower solubility in alcohol. It is probable that this is due to the greater preponderance of sesquiterpene in the high-gravity oils.—*Chemist and Druggist*, July 27,

WATERPROOF PAPER.

Quite a new product into which rubber enters as an essential element is waterproof paper. This is now sold in Manchester, and is largely used in the packing of Manchester goods for abroad. It is a particularly strong brown paper, made from wood pulp, two layers of this being glued together by a solution of rubber of the ordinary type. It is expected to be a great success when it is better known, although, as it has only been on the market a short time, it is too soon to prophesy regarding its future popularity. The rubber solution used in this manufacture is not employed in the same manner as in calico-printing, for, whereas in the latter case the rubber was expected to confer very durable qualities, in the case of the paper it is not intended to be of any service after it has served its purpose as a wrapper of goods.—*India Rubber Trades' Journal*, July 22.

MR. DAVID YULE ON THE TEA INDUSTRY.

At the annual meeting of the Bank of Calcutta Mr. D. Yule, the Chairman, in his speech, referred to the tea industry as follows :—

Our tea gardens are still under a cloud, and the large capital locked up gives hardly any return on the average. I think, however, the cloud is breaking up, for we find buyers of tea willing to pay good prices for quality, although they decline to give anything like covering rates for common descriptions. It has often been pointed out that Indian gardens should endeavour to make their manufacture distinct from the coarse and badly made teas which are produced by Ceylon and China. This is far and away a better policy than throwing a percentage of the bushes out of cultivation. Nature this year has come to our assistance in reducing outturn, and our gardens are fully 20 per cent. behind last year. On the 15th of this month gardens will have made half their crop, but as we are now having September weather in August, there is not much hope of the deficit being made up and early cold weather being expected. Such being the prospects of the crop, I consider present prices too low, and unless garden proprietors bestir themselves to get some advance in values, they will find the balance of their profit and loss accounts on the wrong side at the close of the season. I am glad to say that at last there is some prospect of planters working up a demand for their produce among the millions of Indian people, who so far have not enjoyed the taste of the health-giving properties of the fragrant cup. I say fragrant cup, for recently I have made it my business to get samples of tea sent to me from the bazaars in Calcutta and other towns in India. The stuff our native friends know as tea would, I think, be called by you slow death. The majority of the samples held a visible percentage of shellac and mica sweepings, and others were doctored with some pungent scent apparently for the use of "high life." The Commission which has now been formed is the outcome of a suggestion made by His Excellency the Viceroy in the debate on the Assam Labour Bill, and as you may have noticed in the *Englishman* this morning, the practical effort now being made has his greatest sympathy. This should be sufficient to induce every well-wisher of a struggling Indian industry to say a good word for tea to the people they are in touch with. I am quite sure the Indian people will become a hardier and more

thoughtful nation, if instead of drinking the fiery juice of the palm and unboiled tank water they drink pure Indian tea direct from the gardens. The tea industry of India employs many thousand Indian people, as well as hundreds of our own countrymen; this is only one reason why it deserves the sympathy and help of every thoughtful person in the Empire.

FIBRES AND RUBBER.

We are again indebted to our Paris correspondent, M. Godefroy-Lebeuf, for a chatty letter in respect of his Rubber and Fibre experiences, given in our daily issue and *Tropical Agriculturist.* We may tell him that, while many experiments in Fibre extraction have been made in Ceylon, none has resulted profitably. At the time of coffee depression, Mr. Chas Shand improvised a machine and tried all the local fibres available, and got the best results from *Sanseviera Zeylanica* which grows freely in Colombo gardens; but the margin, even in this case, was too narrow to allow of any profit. Later experiments, by a Colombo Syndicate of practical men, were made to give a full trial of locally-grown aloes in a machine strongly recommended by a Natal patentee, and which was fitted up at the Colombo Iron Works, supplies of aloe branches being brought down free by railway; but the result was not satisfactory and there was an appreciable loss to the pockets of the gentlemen concerned. And yet Ceylon might well be said to be a paradise for the growth of fibrous plants; and Mauritius keeps up a steady export of aloe fibre as much as R700,000 worth being shipped in one year.

THE LAKE FLY NUISANCE.

REPORT OF THE ENTOMOLOGIST.

"My visit to Colombo extended from Tuesday, July 30th, to Friday, August 2nd, during which time I studied the life history of the "Lake Fly" and made the following observations. The insect proves to be a species of Chironomus, one of the aquatic flies, the early stages being passed in the water of the Colombo Lake." Then follows a scientific description of the insect. The concluding part of the report we quote as follows:—

SUGGESTIONS FOR REMEDIAL MEASURES.

In dealing with this pest we are fortunate in having a nearly complete knowledge of the life history of the insect, and it will be possible to attack it at each of the principal stages of its existence.

The eggs, as noticed above, are laid in the water, anchored to some solid substance which will retain them at the surface, ensuring them the amount of light and air necessary for their development. As this part of the lake is kept free from floating weeds by a system of contracts, it follows that the deposition of the eggs must be confined to the margins of the water. The removal and destruction of all floating rubbish and herbage growing in the water at the margins of the lake will ensure the destruction of an enormous number of eggs. This will not prevent the subsequent deposition of fresh hatches of eggs on the bank. But, from my observation that floating sticks form a favorite point of attachment for the egg-masses, I think it would be possible to trap the bulk of the eggs by laying down, in the water along the margins, bamboos lightly covered with brushwood. The eggs would be deposited on these during the night. The following morning the bamboos should be lifted out and left on the bank to dry. The heat and drying action of the sun would kill any eggs deposited on these traps. The bamboos would be returned to the water each afternoon at about 5 o'clock. To reduce the available breeding places, the smaller unoccupied islets might be removed.

The larvæ, living on the surface of the mud and being independent of gaseous air, would be unaffected by any application of kerosene to the surface of the water. The restriction of the eggs to the margins of the lake fixes a limit to the feeding grounds of the larvæ. It is improbable that they would wander very far from their native spot. A zone of some ten yards from the bank, all round the lake, would practically cover the sphere of action of the larvæ. The removal of the mud, to a depth of only six inches, along this marginal zone, will effectually destroy the myriads of larvæ now breeding there. A shallow dredging, repeated twice or thrice during the year, will be much more effective than deeper dredging at longer intervals. It will be necessary to remove the oozy surface mud only. The larvæ will not thrive in the firmer gravelly or sandy mud. The insects inhabiting, as they do, merely the surface layer of the mud, it may be necessary to contrive some modification of the ordinary method of dredging to prevent the dispersal of this superficial layer during the operation. Possibly some form of hand dredging might be employed. I am confident that a judicious system of dredging, on the lines here suggested, will practically remove the nuisance or, at any rate, very greatly mitigate it.

The greater number of the pupæ would be destroyed by the same measures that have been suggested for the removal of the larvae. But in this stage the insect is also vulnerable at a different point, namely at the time when it rises to the surface of the water preparatory to the liberation of the fly. A film of kerosene on the water at this time would kill any of the pupæ with which it came in contact, and would certainly prevent the successful emergence of any flies. If it is decided to give this plan a trial, the application should be made in the evening, shortly before dusk. The simplest and most effective way of applying the oil would be by trailing a rope, covered with rags or tow soaked in kerosene, along the surface, the ends of the rope being attached to two boats which would be rowed along the margins of the lake at a suitable distance from each other. The rope should be periodically recharged with oil.

The adult flies are notoriously attracted by light and might, perhaps, be trapped by bonfires or lighted chulahs placed along the edge of the lake. But I am of opinion that this measure would not really repay the cost. An enormous number of flies might, however, be slaughtered on Dhobies' Island and at other places where they are known to rest during the day, by spraying the grass with a mixture of kerosene and water.

I am most sanguine of profitable results from the employment of the system of dredging suggested above.

E. ERNEST GREEN,
Government Entomologist.

Royal Botanic Gardens, Peradeniya, 10th August, 1901.

The Deaf Hear.—No. 479 of *the Illustrated World* of 626, Chiswick High Road, London, W., England, contains a description of a Remarkable Cure for Deafness and Head Noises which may be carried out at the patient's home, and which is said to be a certain cure. This number will be sent free to any deaf persons sending their address to the Editor.

NEW PRODUCTS:

SUNFLOWER AND CASTOR OIL.

There is no end to the revivals of so-called "new products" in this island. It would be a great saving of time and patience if newcomers inclined to publish their views on such subjects could make themselves acquainted with what has already been written and done in the columns of the Ceylon press and even in the annals of the Planters' Association in past years. There is scarcely any possible product for local exploiting, about which much practical information, with a bearing on Ceylon conditions, cannot be found in the past volumes of the *Tropical Agriculturist.* We see that at present there is a good deal of discussion in regard to the sunflower and castor oil plants. How often, and from how many different points of view, have both products been discussed in past years! In 1889, a Colombo Firm made known its readiness to take as many as 400 gallons of castor oil a month, but without result. Possibly, inattention to this offer at the time was due to the difficulty attending the extraction of the oil; but, on the other hand, there can be little doubt that soils in Ceylon, as a rule, are too poor to yield, for long, profitable crops of oil-yielding seeds such as appertain to the sunflower and castor-oil plants. The former especially requires good soil and it is a question whether it would not, in situations suitable to it, be more profitable to grow cacao. On the other hand, there are districts in the island where the castor oil plant has been found growing like a weed. What would suit the native and even the planter best would be to gather the seed and forward it to Colombo for the extraction of the oil, if the cost of carriage were not prohibitory? A practical Engineer, writing to our contemporary, says that hydraulic plant to extract oil would cost £500 to £600. Would it not be more economical for a suitable "plant" to be established in Colombo or in some central spot upcountry—say on Katugastota estate—to which the cultivators could send and sell their crops of seed? Individual planters could scarcely face an experiment of this kind; but a Firm, with an Engineer who knows all about it, might well do so, and if a suitable Oil Mill were found successful North of Kandy, we would recommend another to be fitted up in Uva; for, it was in Walapane that "the castor-oil plant was reported to grow as a weed." Perhaps, however, the best way to make experiments in regard to oil-seed, as well as fibre extraction, would be to establish suitable machinery on the Government Farm at Gangaroowa, the result being given in periodical circulars for the information of the planting and native community.

Colombia.—The Board of Trade have now received Decrees dealing with these matters, dated April 30th, and May 1st, 1901, respectively, that export duties are to be levied in gold as follows: India-rubber, 100lb. 0 pes. 60 cts, 2s 5d.—*India-Rubber Trades' Journal,* July 22.

INDIAN TEA ASSOCIATION.

Royal Exchange Building, Calcutta, July 30.

Present:—Mr H S Ashton (Chairman), Mr A Tocher (Vice Chairman), Messrs H W Boyd, W Brown, D A Campbell, R H A Gresson, A C Lawrie, and R Magor. Mr R R Toynbee was absent from Calcutta.

GREEN TEA MANUFACTURE.

Letters dated 5th and 12th July, from the Secretary, Indian Tea Association, London, were brought up for final consideration and disposal. The principal question raised in these letters had reference to the bounty to be granted to Companies and Proprietors manufacturing green teas suitable for the American market. With his letter dated 23rd May, Mr. Tye had sent a statement of the views of Mr. W Mackenzie, the India and Ceylon Commissioner in America, upon this question. This statement was summarised in the proceedings of the General Committee meeting held on 18th June. In the letter dated 12th July Mr. Tye stated, in reply to enquiries made by the Committee, that the opinion had been expressed in London that "green" tea of the Ceylon type would no doubt in the long run take the place to some extent of the green tea now used in America. But the manufacture of a pure green tea resembling the Japan type, but without any mineral facing, would be more likely to find a ready market. It was also suggested by the London Committee that a Sub-Committee should be appointed in Calcutta to deal specially with the production and shipment of green teas. After discussion it was decided to appoint a Sub-Committee as suggested. The Vice-Chairman consented to serve upon it; and Mr L C Baines (Messrs. Moran & Co.) and Mr H B Yuille (Messrs Balmer, Lawrie & Co.) were to be invited to act. The Sub-Committee were to be asked to consider and to report upon the feasibility of inducing growers to manufacture green teas of similar quality; and of making arrangements whereby such teas might be bulked in Calcutta, the object being to ensure greater uniformity and to enable orders to be duplicated without difficulty.

3. Considered letters dated 16th and 24th July, from the Honorary Secretary, Central Travancore Planters' Association, respecting the proposal that steps should be taken to induce the Colonial Authorities

TO ABOLISH THE IMPORT DUTY LEVIED IN CEYLON upon Indian Tea. Reference was made to this proposal in the proceedings of the last meeting. It was there recorded that the Committee had decided to ask the Planters' Association for further information with regard to a statement made by their Honorary Secretary that there would be no objection to an *ad valorem* duty of 5 per cent being levied in Ceylon as in India. In replying to these enquiries the Honorary Secretary of the Planters' Association had stated that the members of that Association were quite agreeable to the suggestion that Government should be asked to move for the abolition of the Ceylon duty. The Committee understood that the question generally had been considered at the Annual Meeting of the Assam Branch, which was held on the 20th July. They decided to await the report of the proceedings of that meeting before addressing the Government of India.

H. S. ASHTON, Chairman.

H. M. HAYWOOD, Assistant Secretary.

THE BOMBAY BOTANICAL SURVEY.

THE EXPERIMENT WITH SISAL HEMP.

COLLECTING FOR MR. WILLIS.

The report of Mr. G A Gammie, F.L.S., officer in charge of the Botanical Survey, Bombay Presidency, for 1900-1901, includes the following :—

Mr. Bhide, the Herbarium keeper, completed a tour from Poona to Nagothna. He found many interesting plants, but his purpose was more especially to collect good material of *Podostemon hookerianus* and other species on behalf of Mr. J C Willis, the Director of the Royal Botanic Gardens, Peradeniya, Ceylon, who is making a special study of the order *Podostemonaceæ*. Mr. Willis, during his visit to the Bombay Presidency in search of these plants, was good enough to give us valuable information and identifications of the materials in this herbarium. During the tours special attention was devoted to obscure plants, and many—especially Orchids—were brought back alive to Poona so that Mr. Bhide could figure them at leisure as they came into flower.

Experimental culture of Sisal Hemp.—The station at Nandgaon was fully planted out during the early part of the rains, and the plants under observation there now number 3,000. The plants were in a flourishing condition at the time of my visit, and there is a certainty of the plantation ultimately proving a success. Twenty-one thousand young plants and bulbils were distributed to various applicants and a large number have been promised for this season to the Divisional Forest Officer at Nasik. As the area at my disposal is so circumscribed and as sisal culture has become established in several parts of India, this department may now restrict itself to the growth of plants solely for distribution. During the year ten plants flowered and produced bulbils which were gathered and planted. —*Madras Mail.*

THE NEW MANURE.

Mr. John Hughes writes by last mail :—

Basic superphosphate is taking very well. At the Highland Show at Inverness I was told by the head partner of Messrs. Cunningham & Co. of Leith that they, as the Scotch representatives of the Syndicate, were doing *very well* and had sold over 400 tons already in Scotland. It will be advertised *next* year when we have collected the results of numerous field experiments.

COCONUT DISTRICT: N.W.P.,

Marawila, Aug. 17th.

While the western and central parts of the island are suffering from too much rain, we are passing through rather a

SEVERE DROUGHT.

For over a month we have had no rain, and whatever moisture there happens to be on the surface soil is licked up by a dry, scorching wind that prevails. Rain is very much wanted in these parts. The two biggest

CROPS

of the year are generally harvested between May and August. This year the current crops are said to be very short everywhere. This ought still further to raise the price of copra, for which the demand is as keen as ever it was during this year. A native estate owner is reported to have erected

A FIBRE MILL

on his estate at Kirimetiyana, and to be erecting a desiccating mill. With one mill at Lunuville, one at Horrekelle, and one in prospect between the two, we cannot be said to be badly served as regards the sources of demand for our nuts. The more mills the merrier, say estate owners. In time there will be no such articles of commerce as Madampe, Marawila and estate copra. It is with extreme regret that the whole district of Chilaw has heard of

THE REMOVAL OF MR FRASER

while it cannot withhold from him congratulations on his well-deserved promotion. If he had been permitted to remain two years longer here, those who had been acquainted with the town and the district would hardly have been able to recognise it. The Civil Service has not another more gentlemanly, courteous, hard-working and whole-hearted member than Mr Fraser. His subordinates, from the highest to the lowest, affirm that they seldom worked harder and more cheerfully than with Mr Fraser. It was a pleasure to work with a superior who worked hard himself and who was the soul of courtesy. I have just seen in the papers that Chilaw is intending to give Mr Fraser a "send-off." It is an honour that was not accorded his five predecessors since I have been in the district. That reminds me how badly Chilaw is being treated. It has had six Assistant Government Agents during the 5 years I have been in the district!

PLANTING NOTES.

THE OKAPI.—"Nature" records the fact that Sir Harry Johnston's okapi has now been mounted for the Natural History Museum, and will be exhibited at first in the North Hall. It is said it presents a considerable resemblance in form to a small, short-limbed and short-necked giraffe, although furnished with the large ears characteristic of all forest-dwelling animals, and with an absolutely peculiar type of coloration. No such important discovery has occurred since the giant panda (Æluropus) was made known to the scientific world in the sixties of the last century. —*Globe*, July 26.

AGRICULTURAL PRIZES IN ITALY.—The Federation of the Agricultural Unions of Italy, together with the Agricultural Unions of Padua and Florence, has opened an International Prize Competition for the sum of 1,000 francs in gold, to be awarded to the person who discovers and makes public the best method for obtaining exact and constant results in the determination of the fineness of the flowers of sulphur and of mixtures of sulphur and copper sulphate, to be used for combating diseases of plants. Competitors must send in their papers in a sealed envelope to the Head-office of the Federation (Ufficio direttivo della Federazione italiana dei Consorzi agrari, Piacenza, Italy), before March 1st, 1902. The papers will be examined by a special Commission to be named by the "Reale Academia dei Lincei, Rome," whose decision will be without appeal.—*Journal of the Society of Arts*, July 5.

Correspondence.

To the Editor.

MR. COOKE'S RESERVE TEA SCHEME: A REPLY TO "PATIENCE."

August 3rd.

DEAR SIR,—A clergyman's wife once heard her husband using very strong language; he was out of sight behind a hedge, and she called to him "Patience, dear John; Patience," and he howled back "Would *you* have patience with your foot in a man-trap?"

It does not remain for me to say why simple reduction would be fatal. Many Brokers and writers on tea say that any deficiency of supply from ourselves or even an excessive rise in prices of our teas would drive the Blenders to take China and Japan Tea.

In order that prices *can* be forced up, we have to limit the supply to our present markets to the actual requirements of our Buyers, that is to say, leaving them only a fair margin of profit between purchase and sale price, a certain addition to prices can be made to the customer without reducing consumption.

If we can manage to get a half-penny out of the consumer, and the average price of tea is 18 pence—this half-penny is 1-36th of the price of the tea; it cannot be expected that by raising the price 1-36th the same proportion of reduced consumption will necessarily be made. My idea is that by regulating supplies we shall be able to get one penny out of the buyers and dealers without reducing their profits too much, and a further half-penny or quarter-penny out of the consumers without reducing the consumption to any marked egree.

As long as we can keep within these limits no China tea will be imported to fill up the vacuum.

The reduction scheme proposed to leave the leaf on the bushes, and if this were actually done where would the *supply* for new markets be obtained?

My scheme permits of a supply for this purpose, but the *cost of manufacture* has to be considered, and this would be obtained from a Cess of two pies per pound.

The grower having paid two pies on his whole crop would be that amount out of pocket, unless his action resulted in raising prices by two pies.

Then he would have paid two and a half annas for making the reserved tea, but, as this would be paid for out of the Cess, he would be repaid out of his own money, and would still be two pies per pound out of pocket. But when the reserve tea had been sold and two and a half annas refunded to him he would be exactly in the same position as regards expenditure of money, as if he had allowed the leaf to stay on the bushes. "Patience" says that I have made no suggestion fo stimulating demand. If I have not, I will now say that it stands to reason that *good* average tea, placed *in the hands of* new dealers, is more likely to create a rapid demand than aro present system.

The buyers reserve all our *good* tea for stimulting the demand of their customers; they are ontinually able to give better quality for the ame price; but they send only *scourings* (tea hey don't want) to new markets.

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I argue that average Indian tea put into circulation on the outskirts of our present demand will prove of better effect than offscourings offered at a higher price. We can *if necessary* put this good tea into new hands at *cost price*, not the total cost price, including all expenditure, but merely at the cost of *making* it. *New* markets are fed on skim milk, the cream being extracted by our buyers. I propose that we send the fresh milk (which includes the cream) direct to those who do *not* handle our teas.

I do not propose to "dump" our reserve tea on to new markets; that would be fatal, and it would simply return to our present buyers, but by creating a fund (a 2-pie Cess) of *sufficient magnitude* we shall be able to place our reserve tea with all necessary precautions that it shall *not* return, but stay and create a demand.

A Cess of three pies or four pies would do better, because those who refuse to supply tea would contribute *more* towards the general expenditure. I do not propose to reserve tea and *hold* it for a rise in prices. Having reserved the tea and been paid for it out of the Cess, each estate would keep the tea for the Association and send it *when wanted.* This would prevent the necessity of having an enormous storehouse. The agents of the "Cess Scheme" would wire for supplies to Calcutta and then whatever quantity was wanted would be collected, bulked, &c., and despatched to the agents. "Patience" says that neither growers nor Government will accept a compulsory Cess. Government will certainly agree if we can show that this course of action will allow of the expansion of the tea industry. Germany would *subsidise* the industry and so make all the inhabitants subscribe. We are content to force *all* tea owners to subscribe.

Indian and Ceylon owners offered to reduce, *i.e.* to wipe out 14 million pounds, which, taken at five annas per pound, comes to over 43 lakhs of rupees. Why should they refuse to pay a Cess which would cost them less than ⅓ that amount? Taken at 10 per cent, 14 millions show a production of 140 millions—that is to say the makers of 140 millions offered to pay 43 lakhs without *much* hope of return and a two-pie Cess on 140 millions would cost them about 14½ lakhs only, and I have shown that this would be repaid by the sale of the tea itself. I would point out also that the greater part of the owners, who promised to reduce quantity, were getting *paying* prices and they must have made the promise either because they want better prices, or fear that they may get worse. In my opinion the raising of prices is the last and lowest object in view. I myself am getting a price that pays, but I want to *increase* my yield so that the *same* prices shall pay more profit. Seeing the necessity for *expansion*, I have gone far beyond all other "schemers" and proposed a Cess of two pies per pound *added on to the reduction scheme*.

A. C.

THE PROPOSED GREEN TEA SYNDICATE.

ITS ADVANTAGES SHOWN BY THE ORIGINAL MAKER OF GREEN TEA IN CEYLON.

Travancore, August 9th.

SIR,—With interest I have read in your issue of 3rd inst. your leader, and also Mr. Ryan's interesting letter on the subject of the proposed "Green Tea Syndicate."

This Syndicate is undoubtedly a step in the right direction and I only wish such a scheme were as feasible in this country as it certainly is in Ceylon. In addition to other advantages as pointed out by Mr. Rosling and Mr. Ryan, such as uniformity of invoices, and ability to book repeat orders, two of the greatest difficulties this young trade has had to contend with can be by its means overcome successfully, viz:—

1. It is a matter of common notoriety that must London tea firms, if not openly, then secretly, are against the expansion of the green tea industry, which will undoubtedly deflect tea from their hands, for, however bad prices may rule for black tea in London, however bad prospects may be for proprietors or for shareholders, still a a certain amount of 'sugar' in the shape of commissions on sales, return commissions on freights and often interest on Warehouse and Dock Companies charges, will stick to the fingers of the London merchant so long as the tea enters that port. Not that this is not right and reasonable from his point of view, but the Planters' Association exists for the very purpose of upholding planting interests before any other and by its members forming a Green Tea syndicate or Guild the first difficulty, that of finance, will be overcome. At present the private proprietor in most cases finds great difficulty in drawing against green teas or in any way financing himself save and except by a forced sale in Colombo; but, Sir, I take it that a Syndicate or Guild run under the auspices of the Ceylon Planters' Association (blending its own teas in Colombo to uniform standards under the instructions of some well recognised green tea expert such as Mr. F. Street) would have no difficulty in drawing on America or Canada suffiicently to enable all members of the 'Guild' to receive at least the cost of production, say 25 cents, against the tea on its arrival in Colombo. And this facility would, I believe, give an impetus to the industry of green tea manufacture.

2. The other great drawback to the industry has been the difficulty of disposing of good fannings and clean tea dust—except at a loss—because the Canadian and American markets will have none of it in that shape, and we have not the green-tea-drinking population as in China and Japan to consume it. To suit, then, the tastes of our American and Canadian purchasers, we must eliminate all fannings and dust, which means in practice about 15 per cent and 1 per cent of our manufacture, if thoroughly done, and by this means get a good name in the above markets, where *whole* leaf teas only are of any use. (I would mention here that I have had some samples of Ceylon green teas sent me by Messrs. Moran & Co., Calcutta, which had fetched poor prices in America and that these teas, though drawing good liquor and having good flavour, were simply ruined by a proportion of fannings being mixed in with each grade, no doubt to get over the above-mentioned difficulty).

I submit, Sir, that with a "Syndicate" it will not only be feasible, but urgently advisable, to procure for the Syndicate's use the very best Hydraulic Compressing Machine that money can buy (probably it will be good policy to purchase it in America) and then deal with *this 15 per cent of tea*, moulding it into slabs of, say, 8 oz. again divided into 1 oz. divisions, easily detachable by breaking with the hand as is done with many brands of chocolate. The slabs might be covered wit silver paper and stamped "Pure Ceylon Compresse Tea" on the wrappers, the usual advertising matter stating also that the purity and good quality is guaranteed by the C. P. A., who employ an expert to pass the teas and that this method of preparation is introduced to save bulk in carriage and for the special convenience of travellers and military camps. All experts in green tea are aware that, given the teas are well-made, these neglected qualities draw a good liquor and have an excellent flavour and it is solely the appearance that is against them. Well then with a Syndicate it is at once possible to say "Vanish" fannings, "appear" "Ceylon Compressed Green Tea," which latter, if carefully made and well-advertised, will soon become a very saleable article; or I am much mistaken. The Hydraulic Press is, I know, expensive as I made enquiries years ago, but what was *prohibitive* to a private individual, with no one backing up his experiments, becomes easy of purchase and certain of success when in the hands of that powerful body the C. P. A. Apologising for the length of this letter, which I hope may be of some encouragement to the successful expansion of the Green Tea Enterprise, which was started by myself and in which, though exiled, I take a great interest, —I am, Sir, yours faithfully,

H. DRUMMOND DEANE.

THE TEA RESERVE SCHEME.

August 10th.

Dear Sir,—Your weekly *Observer* of August 1st to hand today. I was going through it as usual without much hope of improvement in our prospects, till I suddenly came on your leader of July 29th about

THE IMPORTANT COMBINE.

My scheme proposed a sum of 20 lakhs, gathered from the entire body of Indian Owners and is five times more than proposed by the Association, but you tell us of one million pounds sterling ! ! ! capital of 150 lakhs of rupees ! ! $7\frac{1}{2}$ times more than I proposed ! ! and it is to be gathered from a combination of Importers. There is some discrepancy in the rumour because 750,000 acres at 15 × 5=20 shillings per acre does not amount to one million pounds. Besides that the area to be brought into line *must* include half of Ceylon also. If we take 240 lb. of tea per acre for 750 thousand acres it comes to 180 million lb., about the total yield of India, and if it was intended that India *only* was to join the scheme it would have been stated definitely. The scheme seems even more complicated than mine, because the owners would have to decide the value of each class of tea separately, and then buy in any particular sort which failed to fetch their valuation. My scheme was intended to rest on the *average* price of all Indian tea and to allow Producers to find out whether they could make tea at that average price.

I do not want to run down the new scheme. It is an excellent one, and I proposed it myself some years ago, but I think that the strongest point in my scheme is "the Cess," a circumstance, a condition, which will force *all* owners to join in supporting their mutual interests. The other scheme would be apt to fall to pieces and leave us worse off than before, but a Cess would last for a definite period. When all owners

are forced to pay the Cess they will interest themselves in the spending of it. You may not have noticed the intimate connection between private tea sales and the Importers' Combine, but when the importers refuse tea to the general buyer they will *get higher prices* at the private tea sales; we understand that some of the buyers want to pay more, and the Importers will let them have their way even at the cost of secrecy. The rumour of this Great Combine, although not absolutely correct, has probably a good foundation. Divide the figures by half—£500,000 and 500,000 acres at £1 per acre, there would be *money* and that is the prime factor to success. The 20 lakhs of my scheme is really all I want to see accomplished, but I could not go on repeating this short sentence. I had to concoct a decent scheme for the use of it. I would warn Tea owners, however, that, if they allow any combine of the sort indicated, those left out will sooner or later be left in the lurch. The combined importers will be able to crush competition amongst buyers, and our fondest hope is that we shall be able to stimulate competition for our Tea.

On July 31st, in your notes you say that Ceylon and India are still far from sufficiently united to run together in the *complicated* working of the plan I proposed in your columns. If I did advise anything complicated and objectionable I withdraw it, and shall expect your full support for the following of a 20-lakh Cess for India and a corresponding amount for Ceylon. A promise on the part of Proprietors to withdraw their surplus from London and to place it in Calcutta or Colombo, and when there is a surplus there, to place it on any terms, (the best they can procure)—on foreign markets with sufficient precautions that it shall not return to Calcutta, Colombo or London. There is certainly no use in going into further details, which can only be decided by those who will be put in charge of our affairs.

On July 29th, in the letter from your London correspondent, he refers to a recent letter for "Regulating Tea sales by a general Syndicate of Proprietors who should feed the market in exact proportion to its requirements &c., &c." I regret that I have missed that letter, unless he refers to my own scheme!! I think it is time to warn all concerned that it is *necessary* for them to join in combined action if they would save their estates. The amalgamation of a few gardens renders them stronger, and lessens the chances of those not amalgamated (excepting of course the great concerns). The amalgamation of large Companies will be infinitely more serious; they will be able to *enforce* the rule of the survival of the fittest. So that, whatever combine is contemplated, it is urgent for each Proprietor that he should insist on belonging to it.

Times are moving, Mr. Editor, and it is to be hoped that you will add all your weight to the movement. Please cease to doubt that Ceylon and India will combine; if you say they *will* do so and they do not do so, it cannot injure your reputation. If you will only pick out the slightest symptoms of mutual agreement and enlarge on it, it will do an infinity of good to the cause. At present we are ready to combine or fight if only our leaders will say which it is to be. Your Ceylon Planters come to India, and promptly "go for" Ceylon on the question of over-production. Some of the big Companies own estates in both countries, and they would surely like to further any chance of agreement and combination. A Cess of 20 lakhs and 14 lakhs from both would do much more good than 20 from India and four from Ceylon. India has robbed Ceylon to three-fourths of the benefit of its Cess, because it had no Cess at all. Ceylon poured tea into foreign markets, but what was the use of it? India poured more into London and prevented a rise in prices. I think that I have already pointed out that there will be a struggle for the extra 2d duty when it is remitted. Our united crop is worth over two million pounds at 2d per pound; surely that is worth having, and shall we get it unless we are combined? Can you propose any scheme, other than the one I have proposed, which will enable us to prevent that two million pounds passing into the hands of the buyers and consumers?

If we put *all* our tea in the market, why should the buyers pay more than they now pay? The customer will pay what he is now paying, and when 2d duty is taken off, who will get it? It *can* be given to the consumer in order to stimulate consumption, but we ought to see that it is not given too rapidly, *i.e.*, not until consumption has increased in *proportion* to the prices reduced.

A.C.

CEYLON TEA IN AMERICA.

Colombo, Aug. 20.

DEAR SIR,—To my mind nothing can justify a continuance of the secret payments made by the Ceylon Tea Commissioner to tea firms whether in Canada or the States. Take the case of a local merchant or exporter who is also interested in estates. He is a tea producer and contributes to the Cess. He is a shipper and a seller in the States and Canada; but the money he provides in the Cess, is paid to the Commissioner who hands it to this taxpayer's competitors in America, who are thus enabled to undersell the Colombo grower-merchant there! There are many in the above position, and we object to money thus provided being paid away to local detriment.

GROWER AND EXPORTER.

[We have never seen the condemnation of the Ceylon Commissioner's policy put so neatly in a nutshell before. From the beginning though, we have held that the Cess money should have gone in advertising for the benefit of all interested in selling our teas and not in secret subsidies sure to provoke jealousy and ill-will.—ED. *T.A.*]

TEA EXPORTS TO AMERICA.

Colombo, Aug. 20.

DEAR SIR,—Have you statistics by you, showing the total quantity of tea imported into the U. States and Canada in each of the last five years from Ceylon, India, China and Japan, each country separately?

It would be an interesting statement.—Yours truly,

MERCATOR.

[We give the best information available at the moment, as follows :—

Tea Exports to North America in lb.

From]	1896.	1897.	1898.	1899.	1900.
India	5,258,773	5,663,244	5,971,701	8,487,443	6,958,370
Ceyl'n	4,364,510	5,698,596	7,636,995	8,289,376	9,173,824
China	30,146,000*	57,000,000§	53,000,000§	44,307,271†	50,901,974†
Japan	62,064,000‡	45,000,000§	42,611,909	40,000,000§	36,000,000§

India and Ceylon are given for the calendar years; but the China and Japan 'seasons' end with April. The total imports into the United States for years ending June 30th are given as follows by the *American Grocer* :—

1896 ...	93,340,248 lb.	1899 ...	72,834,816 lb.
1897 ...	112,907,548 lb.	1900 ...	84,843,491 lb.
1898 ...	67,697,295 lb.		

To this must be added the imports into the Canadian Dominion and Newfoundland, about 25 million lb. a year. Altogether, it is estimated North America requires annually 28 to 30 million lb. of black teas at present and 65 to 68 millions of green and partly fermented teas. The "Commissioner" has also declared that the duty of 10 cents per ton lowered the consumption of tea in the United States by nearly 25 million lb. per annum !—Ed. *T.A.*]

* Excluding Formosa teas. † Including Formosa. ‡ Including Formosa. § About.

THE SPENDING OF THE TEA CESS FUND AND THE CEYLON IMPORT DUTY ON TEA.

Dear Sir,—I am sure all we planters are much indebted to the Ceylon press for the keen interest being taken in matters that so closely concern us in connection with the spending of the Tea Cess Funds, especially as regards America.

From 1894 to end of 1900, the total sum collected by the Cess aggregates close on one-and a-half million rupees.

It would be interesting and instructive, if the "Thirty Committee" were to issue a pamphlet, to all who contribute to the Cess, showing roughly how and where this sum has been spent, and the results of such expenditure to end of 1900. For example, if such as the following information were put clearly before all interested, it might result in the "Thirty Committee" receiving valuable suggestions for their future guidance: such as:—

Summary of Tea Cess Expenditure with results for year ;—

Country.	Salary of Commissioner, &c.	Sums spent by Do.
Proportion of General Expenditure.	Total Expenditure.	Increase during year in lbs. Ceylon tea sold.

One such schedule for each year since the commencement of the Cess, and one general schedule showing the totals for the 7 years. Another schedule for *green tea* would also be necessary.

Now that the Cess has been in existence for several years, there is something to go on, but I, like a good many other planters, am not sufficiently well posted up in the Tea Fund figures to pass any opinion on future expenditure. If the "Thirty Committee" were a little more liberal in distributing concise information to all, as regards expenditure and *results*, good would I feel sure, come of it.

There need be no occasion to publish full details of subsidies made by our Commissioner and the Committee, although I, for one, doubt the necessity for "secret payments." The "Thirty Committee" must judge whether such payments have given results good enough to justify their continuance.

The Committee is composed of the best men in Ceylon, but they are likewise the busiest, and cannot spare the time to go into details. So I think they should appoint a managing Secretary, to devote his *whole* time to the collecting of information as to how and where fund money should be spent.

The salary of such a Secretary or adviser would be money well spent and so would his travelling expenses to Russia or America, or to any country, where it might be necessary for him to visit personally.

The taste for Ceylon tea is gradually becoming universal, so I think the time has now come when the efforts of the "Thirty Committee" would be greatly benefitted, if Goverment were to appoint an Inspector to prohibit the sale and export of all tea below a certain standard to be fixed by the Committee.

I also think the import duty on all British-grown tea into Ceylon should be abolished, and every endeavour made to make Colombo a large tea distributing centre, *the market* for foreign lands. Why force the foreigner to go to London or China! Give him a market sufficiently large and representative in a port so favourably situated as Colombo is, then we shall see foreign markets for British-grown teas increase with leaps and bounds.—Yours faithfully,

ONE OF THE NEW ORDER.

Upcountry, 19th August, 1901.

ON RUBBER, FIBRES, &c.

Paris, la 21 Juillet.

Dear Sir,—I meant by Insulinde (Insulinde) not Insulande, the country constituted by the islands Sumatra, Borneo, Java, etc.—to answer to your demand of last C.O. June 28th.

Formol for the conservation of latex is Aldehyde formique with 60 per cent of water. You obtain Formol at 40 per cent—2 per cent of Formol is sufficient for the conservation of latex. For conservation of flowers and fruits it is preferable to alcohol; it does not change the colour of the samples nor the colour of the nose of the black bearers because these cannot drink this substance.

That the process of extraction of rubber is industrially adopted, any of your readers when in Paris can see if they call at our Co.'s office, 3 rue Scribe, near the Grand Hotel. One block of rubber weighing 105 kilos has been made entirely mechanically with barks of *Landolphia Hendelotii*, perhaps the best rubber plant for dry and almost unfertile soils.

I have received some time ago from the oriental coast of Africa a sample of a new *Sanseviera* or I believe so; and as Ceylon is the paradise for Sanseviera, I believe this plant will be an interesting one for you. You will see by the adjoining design that the leaf is respectable one, fully six feet long, weighing

little more than 2 kilos.; the circumference is about 17 centimeters. This leaf was certainly larger when fresh.

I do not know if *Sanseviera Zeylanica* is regularly grown in Ceylon, for fibre purposes, but I do not believe *S Zeylaniea* is comparable with this new sort. It is not S. Thunbergii, but a distinct species. It is no more *S. Perrotii* from Zanzibar but perhaps near it. A few years ago M M Nicholson and Watson called my attention to *Thunbergii* and I found this new sort a long way from the place where Thunbergii is met with. I believe this gigantic species will be easily adopted by growers, if any Sanseviera grower exists. How do you obtain fibre, by machinery? by hand? We are combining a little measure, but if we succeed well with all the Sanseviera with round leaves, such as cylindrica, sulcata and the new species; we have been unsuccessful with the species with flat leaves such as Zeylanica, longiflora, Guiniensis or others. I hope, in a few years, growers will think about these fibre producers and Sanseviera fields will be as common as Mauritius hemp or Henequin fields! *This new Sanseviera* gives fully 7 per cent of very fine and silky fibre.

I have introduced recently a new rubber producer, the Forsteronia floribunda. Forsteronia is an apocynaceous climber and more than forty are known in America, chiefly in Brazil. Two species have been regarded as producers of rubber: *F gracilis* from Guiana and *F floribunda* from Jamaica. F gracilis is a gigantic climber, one plant sent by one of my collectors reached 4½ yards in two months, in my house. I believe *floribunda* is not a free grower but its product is as good as Para rubber. Kew regards its quality and I have been astonished when I received this same field plant from Haiti. I hope to receive fresh seeds in a few weeks. As my thermometer is always at 27 degrees Centigrade (81 to 82 degrees Fahrenheit!—ED.), allow me to present you my best compliments.

A. GODEFROY-LEBEUF.

PLANTING NOTES.

ABANDONING TEA AND COFFEE IN SUMATRA.—We learn that the British Deli and Langkat Tobacco Co., Ltd., have closed their Tea and Coffee estate, confining their attention to their staple, tobacco. A grain of comfort this for coffee and tea planters suffering from over-production.

TEA COMPANIES' CAPITAL.—From the latest *Investors' Guardian* we see that as much as £484,500 sterling was registered in new tea companies during the first six months of 1901, as against £18,000 in the same period, 1900, and £420,000, 1899. We quote as follows:—

"With the depression which has been the chief characteristic of the business of tea companies and from which not even the most soundly established have escaped, it is rather surprising to find a sum of nearly £500,000 to the credit of this year against only £18,000 in the first six months of 1900. It would appear as if some were possessed with a sublime confidence in the future of the tea industry which no depth of present depression can affect."

No capital was registered for Scotch or Irish tea companies this year or last; and only £3,000, in Irish, was invested for the period in 1899.

PINE HILL ESTATES COMPANY.—In these times of depression even 4 per cent must be regarded as a fairly good dividend on tea property, and we are pleased to notice from the report of the Pine Hill Estates Company meeting today that this amount has been declared. We congratulate all concerned.

CACAO GROWING IN SAMOA.—For Mr. Moors' long and interesting letter on this subject, see our last weekly issue and next *T.A.* We have given answers to certain questions in editorial notes to the letter. It will be observed that Mr R. Carruthers expected to get 22 cwt. of cocoa per acre altogether in one year's crop, having got 17 from the Spring return and more looked for in October.

PEMBA RUBBER.—Various species of rubber vines grow wild all over the island, but can hardly be said to exist in paying quantity. The late Mr Robertson, of His Highness's Agricultural Department, devoted some attention to the rubber vines during a visit which he paid to Pemba in the course of last year. He established some fifteen workmen at Ghazi, a district in the north of the island, where the vines exist in considerable number, their duty being to clear away the dense growth of useless vegetation and generally to look after the vines. There appears to be no reason why rubber should not be successfully cultivated here, and it certainly is one of the most paying of crops.—*India-Rubber Trades' Journal*, July 22.

THE FIG TRADE OF SMYRNA.—Figs form one of the most important items of export from Smyrna and a description of the trade is contained in the last report of the British Vice-Consul at that place. The chief markets for Smyrna figs are the United Kingdom and the United States, some of the Continental countries also taking small quantities. The district in which the fruit is grown lies wholly along the Smyrna-Aidan railway. There are two kinds of figs, both growing on the same tree—that for eating and that for distilling. The fruit grown on the plains is larger and richer in saccharine matter, but on the other hand the trees here suffer frequently from excess of moisture, while those on the higher ground escape the consequences of wet seasons. The fruit ripens about the middle of August, when it is picked and dried in the open air for a few days. It is then packed in sacks of about 250lb. each on camels and sent to the nearest station, whence it is conveyed by train to Caravan Bridge, Smyrna, and so to the purchasers in that town. The arrival of the first camel-load there is celebrated as a popular festival for the washing, drying and packing give employment to thousands of families. The dried figs for food are sold before the end of November, after which the sales are almost wholly those of figs for distilling; some of the latter are sent to Austria, where they are used as a substitute for chicory. Last year the crop amounted to 65,000 loads of 500lb. each, the usual price being £1 to £1 5s, per load. Another agricultural product of the Smyrna district, which forms an important item of export, is valonia, the cup of the acorn, which is of great value in tanning, as it gives weight and consistency to the leather, while the colour which results is very fast. The oaks which bear the acorns are beaten with long sticks during the autumn and the valonia dried in the sun and then sent to Smyrna, where it is graded. Last year the export from Smyrna amounted to 68,000 tons, of the value of £2 6s. to £3 6s. per ton.—London *Times*, July 2.

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buy-ers.	Sell-ers.	Tran-sactions
Agra Ouvah Estates Co., Ltd.	500	—	865XD	865XD
Ceylon Tea and Coconut Estates	500	—	—	...
Castlereagh Tea Co., Ltd.	100	70	...	..
Ceylon Provincial Estates Co. Ltd.	500	485XD	..	500
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	40	75	—
Clyde Estates Co., Ltd.	100	—	—	—
Doomoo Tea Co., of Ceylon Ltd.	100	65	..	—
Drayton Estate Co., Ltd.	100	...	...	...
Eila Tea Co., of Ceylon, Ltd.	100	..	40	...
Estates Co of Uva, Ltd.	500	..	250	—
Gangawatta	500	—	—	..
Glasgow Estate Co., Ltd.	500	900	—	—
Great Western Tea Co., Ltd.	500	610	—	—
Hapugahalande Tea Estate Co.	200	—	—	..
High Forests Estates Co., Ltd	500	...	550	...
Do part paid	400	—	450	—
Horekelley Estates Co., Ltd.	100	60	..	—
Kalutara Co., Ltd.	500	—	250	—
Kandyan Hills Co., Ltd.	100	—	40	—
Kanapediwatte Ltd.	100	—	85	—
Kelani Tea Garden Co., Ltd.	100	—	—	—
Kirklees Estates Co., Ltd.	100	—	120	...
Knavesmire Estates Co., Ltd.	100	—	60	—
Maha Uva Estates Co., Ltd	500	—	400	—
Mocha Tea Co., of Ceylon, Ltd.	500	—	—	—
Nahavilla Estate Co., Ltd.	500	—	300	...
Neboda Tea., Co. Ltd	500	..	500	—
Nyassaland Coffee Co. Ltd	100	—	—	..
Palmerston Tea Co., Ltd.	500	...	400	400
Penrhos Estates Co., Ltd.	100	—	100	—
Pitakanda Tea Company	500	—	—	—
Pine Hill Estate Co., Ltd.	60	—	37·50	—
Putupaula Tea Co., Ltd.	100	—	—	—
Ratwatte Cocoa Co., Ltd.	500	—	250	—
Rayigam Tea Co. Ltd.	100	—	40	...
Roeberry Tea Co., Ltd.	100	60	70	—
Ruanwella Tea Co., Ltd.	100	—	—	—
St. Helier's Tea Co., Ltd.	500	—	500	...
Talgaswela Tea Co., Ltd.	100	—	35	...
Do 7 per cent Prefs.	100	..	70	...
Tonacombe Estate Co., Ltd.	500	...	325	...
Udugama Tea & Timber Co., Ltd.	50	...	..	..
Union Estate Co., Ltd.	500	...	200	...
Upper Maskeliya Estates Co. Ltd.	500	430	450	—
Uvakellie Tea Co., of Ceylon, Ltd.	100	55	..	—
Vogan Tea Co., Ltd.	100	—	...	—
WanarajahTea Co.,Ltd.	50	..	1000	—
Yataderiya Tea Co., Ltd.	100	100	—	150

CEYLON COMMERCIAL COMPANIES.

Company	paid p. sh.	Buy-ers.	Sell-ers.	Tran-sactions
Adam's Peak Hotel Co., Ltd.	100	...	30	—
Bristol Hotel Co., Ltd.	100	..	120	120
Do 7 per cent Debts.	100	105	—	—
Ceylon Gen. Steam Navgtn. Co., Ltd	100	200	225	225
Ceylon Superaeration Ltd.	100	—	70	—
Colombo Apothecaries' Co. Ltd.	100	...	$137\frac{1}{2}$	$137\frac{1}{2}$
Colombo Assembly Rooms Co., Ltd.	20	15	..	...
Do prefs.	20	...	...	—
Colombo Fort Land and Building Co., Ltd.	100	—	85	—
Colombo Hotels Company	100	290	—	290
Galle Face Hotel Co., Ltd.	100	160	...	160
Kandy Hotels Co., Ltd.	100	...	120	..
Mount Lavinia Hotel Co., Ltd.	500	...	250	..
New Colombo Ice Co., Ltd.	100	...	190	190
Nuwara Eliya Hotels Co., Ltd.	30	30	..	..
Do 7 per cent prefs.	100	107	110	..
Public Hall Co., Ltd.	20	$12\frac{1}{2}$	14	—

LONDON COMPANIES.*

Company	paid p. sh.	Buy-ers.	Sell-ers.	Transaction
Alliance Tea Co., of Ceylon, Ltd.	10	...	8—9	..
Anglo-Ceylon General Estates Co.	100	..	45—55	..
Associated Estates Co., of Ceylon	10	—	1—3	...
Do. 6 per cent prefs.	10	..	4—6	..
Ceylon Proprietary Co.	1	...	$\frac{1}{4}$—$\frac{1}{2}$	..
Ceylon Tea Plantation Co., Ltd.	10	..	24—25	..
Dimbula Valley Co., Ltd.	5	..	5—$5\frac{1}{2}$	..
Do prefs.	5	..	5-6	...
Eastern Produce & Estates Co. Ltd.	5	...	$3\frac{1}{2}$—$4\frac{1}{2}$	..
Ederapolla Tea Co., Ltd.	10	...	6—8	...
Imperial Tea Estates Co., Ltd.	10	...	$3\frac{1}{2}$—$4\frac{1}{2}$	..
Kelani Valley Tea Assen., Ltd.	5	..	3—5	...
Kintyre Estates Co., Ltd.	10	...	6—8	..
Lanka Plantation Co., Ltd.	10	..	$3\frac{1}{2}$—$4\frac{1}{2}$	..
Nahalma Estates Co.,Ltd.	1	—	nom	..
New Dimbula Co., Ltd.	1	...	$2\frac{5}{8}$—3	..
Nuwara Eliya Tea Estate Co., Ld.	10	$9\frac{3}{4}$	10	10
Ouvah Coffee Co., Ltd.	10	..	6—7	...
Ragalla Tea Estates Co., Ltd.	10	..	12	..
Scottish Ceylon Tea Co.,Ltd.	10	—	12—15	...
Spring Valley Tea Co., Ltd.	10	...	2—4	..
Standard Tea Co., Ltd.	6	$10\frac{1}{2}$	10—11	...
The Shell Transport and Trading Company, Ltd.	1	..	$2\frac{7}{8}$—$3\frac{1}{8}$	..
Ukuwella Estates Co., Ltd.	25	—	par	...
Yatiyantota Ceylon Tea Co., Ltd.	10	...	$4\frac{1}{2}$—5	...
Do. pref. 6 o/o	10	...	9—10	..

BY ORDER OF THE COMMITTEE.

Colombo, August 30th 1901.

* Latest London Prices.

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1896.	1897.	1898.	1899.	1900	Av of 31yrs.	1901
	Inch	Inch	Inch	Inch.	Inch.	Inch.	Inch
January ..	2·92	3·81	2·32	6·98	3·72	3·24	11·91
February ..	0·35	1·68	1·98	2·78	0·63	1·89	3·55
March ..	5·64	3·66	4·21	0·88	3·71	4·75	5 12
April ..	5·93	10·97	22·81	6·66	15·12	11·43	8·71
May ..	9·31	8·30	5·80	17·73	10·63	12·04	6·28
June ..	8·37	10·14	10·94	9·23	7·83	8·35	5·93
July	2·85	5·24	6·15	1·11	6·77	4·30	4·54
August ..	6·35	9·09	0·97	0·62	7·35	3·79	0·41*
September	10·99	4·58	6·90	1·48	4·00	4·98	
October ..	16·78	4·71	20·60	12·99	9·47	14·36	
November..	19.81	11·66	17·38	8·58	9·25	12·55	
December..	11·76	8·89	3-05	4·44	5·20	6·35	
Total..	101·06	82·73	103·11	73·48	83·68	88·03	46·43

* From 1st to 28th Aug. 0·41 inch, that is up to 9-30 a.m on the 29th Aug.—ED. *C.O.*

KOLA—to the value of 2,280*l.* was shipped from Gambia during 1900, against 2,199*l.* in 1899, and 1,345*l* in 1898. The exports of bees' wax decreased considerably last year, being valued at 922*l.* only against 4,411*l.* in 1899.—*Chemist and Druggist,* August 10.

RICE AND CLIMATE IN THE NORTH-CENTRAL PROVINCE.—A gentleman interested in agricultural progress in the more backward divisions of Ceylon, writes from Anuradhapura :—" Why is it so little so-called 'table rice' appears to be grown in Ceylon? Up here only the 'quick' rice is grown, which is of course due to the precariousness of the water supply; even where village tanks exist, as they are usually only too small, 'heeneti' is mostly patronised There does not seem to be much 'public' information to be had about rice. I can understand it, though, as only a few whites are directly connected with the plant. I must say so, for I am charmed with the climate as a whole, up in this district."

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS.

Colombo, Aug 26th, 1901.

CARDAMOMS :—
All round parcel, well bleached per lb. R1·45
Do. dull medium do. R1·30
Speoial assortment, 0 and 1 only do. R1·80
Seeds do. R1·35

CINCHONA BARK :—
Per unit of Sulphate of Quinine 9c—1½ to 3 o/o.

CINNAMON :—
Ordinary assortment per lb. 51c.
Nos. 1 and 2 only per lb. 55c,
Nos. 3 and 4 only per lb. 47c.

CINNAMON CHIPS :—
Per candy of 560 lb R75·00

COCOA :—
Finest estate red; unpicked per cwt None
Medium do do ,,
Bright native unpicked and undried ,,
Ordinary do do do ,,
} No quotations.

COCONUTS—(husked).
Selected per thousand R47·00
Ordinary ,, R39·00
Smalls ,, R29·00

COCONUT CAKE—
Poonac in robins f. o. b. per ton R80·00
Do in bags None

COCONUT (Desiccated).
Assorted all grades per lb 16c

COCONUT OIL—
Dealers' Oil per cwt R15·25.
Coconut Oil in ordinary packages f. o. b. per ton R338·75 Business done at lower figure

COFFEE.—
Plantation Estate Parchment on the spot per bus. None.
Plantation Estate Coffee f.o.b. (ready) per cwt — None.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—44c

COPRA—
Boat Copra per candy of 560 lb. R55·00
Calpentyn Copra do do R55·00
Cart do do do R50·00
Estate do do do R55·50

CROTON SEED per cwt—None

EBONY—
Sound per ton at Govt. depot—R190. As per sales of 3rd June.
Inferior R100. As per sales of 3rd June.

FIBRES—
Coconut Bristle No. 1 per cwt R12·00
Do ,, 2 ,, None
Do mattress ,, 1 ,, 3·75
Do ,, 2 ,, 3·00
Coir Yarn, Kogalla ,, 1 to 8 None
Do Colombo ,, 1 to 8 None
Kitool all sizes ,, None
Palmyrah ,, None

PEPPER—Black per lb None

PLUMBAGO—
Large lumps per ton R550
Ordinary lumps do 530
Chips do 350 Fine qualities scarce.
Dust do 200
Do (Flying) 120

SAPANWOOD— per ton None.

SATINWOOD (ordinary) per cubic ft. 3·10
Do do per cubic ft. None.

TEA—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	58	44	41
Orange Pekoe do	51	38	38
Pekoe do	45	32	27
Pekoe Souchong do	40	28	24
Pekoe Fannings do	33	26	27
Broken mixed—dust, &c	25	24	23

CEYLON EXPORTS AND DISTRIBUTION FOR SEASONS 1900 AND 1901.

COUNTRIES	Black Tea. 1901 lbs.	Black Tea. 1900 lbs.	Green Tea. lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cocoa cwts.	C'moms lbs.	Cinnamon Bales lbs.	Cinnamon Chips. lbs.	Coconut Oil. 1901 cwt	Coconut Oil. 1900 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac cwts.	Coconuts. No.	Plumbago. 1901 cwts.	Plumbago. 1900 cwts.	Fibre cwts.
To U K. ..	70585830	77447218	139800	5245	..	5245	28184	176877	397535	146359	136806	152604	15288	6874601	1000	8579395	112587	78102	44033
,, Austria ..	38495	11057	..	..	..	...	45	..	5900	12320	2685	5679	21251	65166	...	..	...	2	...
,, Belgium ...	13166	12455	...	53	..	53	100	6000	38300	64400	3291	1025	44480	289835	46185	176125	12701	25618	15685
,, France ..	189404	155121	...	204	...	204	30	1469	30900	3920	...	..	42311	2240	500	406	286	102	467
,, Germany ..	298977	238762	...	9	..	9	1415	16889	439265	328932	2413	8245	60339	795991	41539	508220	31025	34249	8056
,, Holland ..	15589	2000	...	...	..	..	..	..	13500	58240	..	...	..	39000	..	..	..	912	569
,, Italy ..	8681	5007	..	..	..	..	..	480	77600	51072	1487	..	..	..	...	6542	..	...	...
,, Russia ..	6179059	5513548	...	126	..	126	123	764	...	..	...	..	31156	..	..	..	3713	1004	..
,, Spain ..	...	15130	...	..	...	..	..	..	90800	39200	..	..	...	10370	..	..	...	..	..
,, Sweden ..	31304	51118	..	...	..	..	..	..	..	11200	199	...	3925	6450	..	..	..	105	..
,, Turkey ..	27269	12843	...	...	..	...	...	..	..	...	..	...	...	...	...	...	...	...	..
,, India ..	912133	523216	16124	62	..	62	..	99063	..	.	64100	43525	637	..	...	286900	230	800	19
,, Australia ..	14089125	10390312	1714	1807	10	1817	168	...	3856	47868	94	83		541961	...	..	132	1637	3130
,, America ..	1560173	3288908	455484	155	..	155	1061	2781	169300	26837	9010	40784	1	771219	...	..	108041	100350	1708
,, Africa ..	189405	120101	..	..	..	..	..	496	..	..	76	...	..	8773	..	1146315	...	...	80
,, China ..	2010779	895139	4853	34	...	34	149	5205	15100	..	767	827	..	74334	..	1200	..	41	..
,, Singapore ..	86829	62538	...	..	..	...	1341	60	7700	..	...	1927	...	..	...	...	..	...	262
,, Mauritius ..	29376	700	..	20	..	20	...	..	..	..	..	..	...	..	...	...	..	..	..
,, Malta ..	214509	254378	..	..	...	..	..	..	...	..	..	..	..	...	..	..	..	..	..
Total export from 1st Jan. to 26th Aug, 1901	96480102	98999551	617975	7715	10	7725	32616	310084	1289756	790348	220868	254699	219388	9479940	89224	10705103	268715	242922	74009

MARKET RATES FOR OLD AND NEW PRODUCTS

(From Lewis & Peat's Fortnightly Price Current, London, August 7th, 1901.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ..	44s a 80s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
ARROWROOT (Natal) lb.	Fair to fine ..	5½d a 6¼d
BEES' WAX, cwt.		
Zanzibar & Bombay { White ,,	Good to fine	£6 a £7 10s
Yellow ,,	Fair	£6 5s a £6 15s
Madagascar ,,	Dark to good palish	£6 10s a £6 15
CAMPHOR, China ,,	Fair average quality	Nominal
Japan ,,	... .	165s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 3d a 2s 4d
	Middling, stalky & lean	1s 5d a 1s 7d
Ceylon.—Mysore ,,	Fair to fine plump ...	1s 6d a 3s 9d
	Seeds ..	1s 11d a 2s 1d
,, Tellicherry ,,	Good to fine ..	2s 11d a 3s
	Brownish ..	2s 6d
,, Long ,,	Shelly to good ..	3d a 6d
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	4d a 4½d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	35s a 45s
CINCHONA BARK.—lb. Ceylon	Ledgeriana Orig. Stem	3d a 5½d
	Crown, Renewed	5d a 7d
	Org. Stem	3¾d a 5½d
	Red Org. Stem	3⅜d a 4¼d
	Renewed	3d a 5⅝d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill	10d a 1s 6d
2nds	,, ,,	9d a 1s 5d
3rds	,, ,,	8½d a 1s 4d
4ths	,, ,,	8d a 11d
Chips	,, ,,	2¾d a 10d
CLOVES, Penang lb.	Dull to fine bright bold	4½d a 9½d
Amboyna ..	Dull to fine	4⅝d a 5½d
Zanzibar and Pemba }	Good and fine bright	4d a 4½d
	Common dull to fair	3¾d a 3⅞d
Stems ..	Fair	1⅝d
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	92s 6d a 117s
	Middling to fine mid ...	70s a 104s
	Low mid. and low grown	
	Smalls	40s a 60s
Native	Good ordinary	30s a 40s
Liberian ,,	Small to bold	30s a 37s 6d
COCOA, Ceylon .	Bold to fine bold	77s a 93s
	Medium and fair	65s a 77s 6d
	Native	55s a 62s
COLOMBO ROOT ,,	Middling to good	10s a 22s 6d
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair	£13 10s a £18
FIBRE, Brush ,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£20 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £30
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	20s a 22s
CUTCH ,,	Fair to fine dry	23s a 35s
GINGER, Bengal, rough ,,	Fair	34s
Calicut, Cut A ,,	Good to fine bold	85s a 95s
B & C ,,	Small and medium	40s a 77s 6d
Cochin Rough ,,	Common to fine bold	34s a 41s
	Small and D's	30s a 35s
Japan ,,	Unsplit	33s a 34s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	15s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £20
	Part yellow and mixed	£7 15s
	Bean and Pea size ditto	70s a £9 2s 6d
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	35s a 58s
Turkey sorts ,,		40s a 45s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ...	20s a 35s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	60s a 137s 6d
	Ord. stony and blocky	6s a 25s
KINO ,,	Fine bright	1s 3d a 1s 6d
MYRRH, picked ,,	Fair to fine pale	90s a 107s 6d
Aden sorts ,,	Middling to good	50s a 80s
OLIBANUM, drop ,,	Good to fine white	35s 6d a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	18s a 23s
siftings ,,	Slightly foul to fine	16s 6d a 22s
INDIARUBBER, Assam lb	Good to fine	2s 2d a 2s 8d
	Common to foul & mxd.	7d a 1s 6d
Rangoon	Fair to good clean ...	2s a 2s 9d
Borneo	Common to fine	1s a 2s 3d

	QUALITY.	QUOTATION
INDIARUBBER, (Contd.)		
Java, Sing. & Penang lb.	Foul to good clean ...	8d a 2s 9d
Mozambique ,,	Good to fine Ball ...	2s 6d a 3s 2d
	Ordinary to fair Ball ...	1s 10d a 2s 6d
	Low sandy Ball ...	1s 3d a 1s 7d
	Sausage, fair to good ..	2s 6d a 2s 11d
	Liver and Livery Ball ..	2s 4d a 3s
Nyassaland	Fair to fine ball ..	2s 2d a 3s
Madagascar	Fr to fine pinky & white	2s 6d a 2s 9d
	Fair to good black ..	2s a 2s 6d
	Niggers, low to fine ..	7d a 2s
INDIGO, E.I.	Bengal—	
	Shipping mid to gd violet	3s 8d a 4s 6d
	Consuming mid. to gd.	3s 2d a 3s 6d
	Ordinary to mid.	2s 10d a 3s 1d
	Mid. to good Kurpah	2s a 2s 6d
	Low to ordinary	1s 6d a 1s 10d
	Mid. to good Madras	2s a 2s 10d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2 a 3s
	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 3d a 1s 4d
MYRABOLANS, } cwt	Dark to fine pale UG	5s a 6s
Madras	Fair Coast	5s
Bombay ,,	Jubblepore	5s a 6s 3d
	Bhimlies	4s 3d a 7s 6d
	Rhajpore, &c.	4s 3d a 6s
Bengal ,,	Calcutta	3s 6d a 5s
NUTMEGS— lb.	64's to 57's	2s 1½d a 2s 6d
Bombay & Penang ,,	110's to 65's	1d a 2s 1d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	14s a 17s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	4s a 5s 6d
Madras	Fair to good bold fresh	7s a 10s 6d
	Small ordinary and fair	5s a 6s 6d
OIL OF ANISEED ,,	Fair merchantable	5s 3d
CASSIA ,,	According to analysis	3s a 3s 3d
LEMONGRASS ,,	Good flavour & colour	5d a 5½d
NUTMEG ,,	Dingy to white	1¼d a 3d
CINNAMON ,,	Ordinary to fair sweet	3¼d a 1s 6d
CITRONELLE ,,	Bright & good flavour	9½d a 10d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody...	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 14s
	,, wiry Mozambique	10s a 11s
PEPPER—(Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ...	5⅝d a 6⅛d
Singapore	Fair	6d
Acheen & W. C. Penang	Dull to fine	5⅜d a 6¼d
PLUMBAGO, lump cwt.	Fair to fine bright bold	30s a 35s
	Middling to good small	20s a 32s
chips	Dull to fine bright ..	9s a 15s
dust	Ordinary to fine bright	3s 6d a 8s
SAFFLOWER	Good to fine pinky ..	65s a 75s
	Inferior to fair	40s a 60s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£20 a £50
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Ceylon ,,	Fair to good ..	£5 a £5 10s
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth ...	£7
SEEDLAC cwt.	Ord. dusty to gd. soluble	50s a 55s
SENNA, Tinnevelly lb.	Good to fine bold green	4d a 6d
	Fair greenish	3d a 3½d
	Common dark and small	1d a 2½d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's / D's and B's / Small ...	£3 a £5 5s
Mergui ,,	Small to bold ..	£7 10s
Mussel ,,	Small to bold ...	22s a 65s
TAMARINDS, Calcutta...	Mid. to fine bl'k not stony	10s a 11s
per cwt. Madras	Stony and inferior ..	7s 6d a 10s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	18s a 22s 6d
TURMERIC, Bengal cwt.	Fair ...	23s
Madras ,,	Finger fair to fine bold bright	22s a 25s
	Bulbs ..	20s a 21s
Do. ,,	Finger ..	20s a 22s
Cochin ,,	Bulbs ...	6s 9d a 7s 6d
VANILLOES— lb.		
Mauritius ... } 1sts	Gd. crysallized 3½ a 9 in	14s a 24s
Bourbon ... } 2nds	Foxy & reddish 3½ a 8 ,,	13s a 17s 6d
Seychelles 3rds	Lean and inferior ...	8s a 12s
VERMILION lb.	Fine, pure, bright ,,	[illegible]s 3d
WAX, Japan, squares cwt	Good white hard ...	[illegible]s a 33s

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for September :—

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AGRICULTURAL BANKS.

IF there is any place where the establishment of State Agricultural Banks would prove to be of undoubted value it is Ceylon, where the condition of the small landholder is deteriorating day by day. There are several causes which have been and which are at work in reducing the prosperity of the *goyiya*. The limitation of the area of land available for his operations through the better defining of Crown titles and the division of land among a large number of inheritors, the exhaustion of the soil in patches of land which have been under cultivation for long periods without the addition of fertilizers, and the increase of individual expenses of the cultivators through the introduction of new articles of food and clothing, and through the increase in the prices of articles of daily use, have one and all contributed to the increasing poverty of the cultivator. These and other causes have driven him into the hands of the money-lender, whose exorbitant rates of interest have in many cases completed the ruin of many a prosperous cultivator. Before one can advocate the establishment of Agricultural Banks, there are two questions that will have to be satisfactorily answered :—Are the cultivators of land involved to such an extent as to make indebtedness a general rule, and are they paying rates of interest which can be classed as unreasonable and ruinous? Secondly, is this state of things causing any serious deterioration of the prosperity of the country, and will the establishment of Agricultural Banks lead to an improvement in the existing state of things, and bring on such results as will justify the trouble and labour that will be required in their establishment and maintenance? Both these questions can be satisfactorily answered without entering into an elaborate system of calculation, which cannot be accurate for want of necessary statistics and particulars. There is one simple way of gauging the indebtedness of the cultivator. A return of accounts lent on mortgage deeds during a year can be obtained from the Registrar-General's Department. Such a return for a series of years will not only shew the amount of indebtedness, but will shew the proportions in which this has increased year by year. In addition to loans raised on mortgages, there is the continual secondary loan system by which a cultivator borrows from the petty trader in the village all the seed paddy he requires for sowing his rice fields, all the manure he requires for use in the fields, and the little money he takes for his urgent necessaries. All these are received against the crops, and after harvesting the lender is repaid with such rates of interest as are now commonly agreed on. Both these systems of raising loans are, it may be said, becoming universal in every village, but as regards the last-mentioned method there is no way of obtaining a return or of expressing in figures the extent to which it is resorted to. The best means for obtaining anything like an idea of the extent of these temporary loans will be to select three or four villages in different districts at random and obtain returns of the temporary lo

with a view to forming an idea as to the extent to which they prevail. Then it will be found that almost every acre of paddy land under cultivation is indebted to the extent of 6 to 7 rupees each season. As to the rates of interest it will easily be found that they are most unreasonable and ruinous. The usual rates of interest in a village on a mortgage bond is from 20 to 30 per cent per annum on the capital, and on advances against crops from 50 to 100 per cent per four months on the capital advanced, working to aboat 150 to 300 per cent per annum. The crop loaus are always given for the season, and 50 per cent is the lowest charge ever made in a vlllage. These figures are so enormous, it is to be feared that in many quarters they may be put down as exaggerations or isolated instances; however, it may be emphatically stated here that 20 per cent on the mortgage of property and 50 per cent against crops are the minimum rates.

It must be plain to any observer, that with the depression in the productive power of land and the limitation of the area of land obtainable, and the increase in the cost of living, the margin of profits left to the cultivator must be really small, or in the most cases is a diminishing quantity. And when to all these depressing effects the rates of interest at which captal is borrowed is added, there is no reason to suppose that the average cultivator will be able to stem the current of depression unless he gets some timely aid from some new direction. There is another question which, if explained, will make our case clearer. It may be said that there must be a certain amount of prosperity in the villages to enable the cultivators to borrow to such an extent, and the sooner the weaker men succumb, the better it will be for the general state of prosperity. However, the village lender is not the villager, but the itinerant hawker, the Moorman, who has now his boutique in almost every village in the island, and who is the only man profited by this state of depression. He lends the money, he makes the advances on crops, and buys the produce at his own rates, and charges the ruinous rate of interest.

The establishment of Agricultural Banks at this juucture will be very opportune. They will just be in time to give the necessary stimulus to industry which is passing through depression.

Agricultural Banks are not new instiutions, they have been established in a limited scale in the Deccan, and have worked with immense success. The latest Iudian Budget statement shews that arrangements are in progress for their establishment in India on a more general scale. New Zealand has a successfully worked loan office established since 1895. The operations at this loan office were restricted to freehold mortgages upon gardens and farms, the charges for the survey of land proposed to be mortgaged was only half a guinea to two guineas, and the legal fees from 25*s*. to £2 according to the scale of the loan raised. The interest charged is fixed at 5 per cent, and the borrower has the option of obtaiuing his loan iu two forms, either for a fixed period, or on an instalment system. Where the instalment system is adopted an annual charge of 1 per cent extra is made as a sinking fund; on this basis a borrower of £100 by paying £6 per annum wipes out his debt in 37 years. This scheme has since been adopted in Victoria, South Australia, and other Australian Colonies.

The conditions prevailing in Ceylon will require the working of details to suit our circumstances, but this will not present mauy difficulties.

In addition to affording immediate relief to the cultivators, an Agricultural Bank, if established, will be the means of opening up a large extent of new land under our projected railway and irrigation schemes. It may also not be out of place to mention here that the benefits of a scheme of a properly-organized State Agricultural Banks will not in auy sense be confined to the small agriculturist, whose claims have been advocated here. The large and more enterprising landowners, European and Native, are in a measure bound to benefit greatly by such an institution.

W. A. D, S.

Colombo, 18th August, 1901.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF AUGUST, 1901.

1	Thursday ...	·13	17	Saturday ..	·01
2	Friday ..	·01	18	Sunday ...	·09
3	Saturday ..	·01	19	Monday ..	Nil
4	Sunday ..	Nil	20	Tuesday ..	Nil
5	Monday ..	Nil	21	Wednesday	Nil
6	Tuesday ..	Nil	22	Thursday ..	·03
7	Wednesday ...	0·2½	23	Friday ..	Nil
8	Thursday ..	Nil	24	Saturday ...	Nil
9	Friday ..	Nil	25	Sunday ..	Nil
10	Saturday ..	Nil	26	Monday ..	Nil
11	Sunday ..	Nil	27	Tuesday ..	Nil
12	Monday ..	Nil	28	Wednesday	Nil
13	Tuesday ..	Nil	29	Thursday ..	·11
14	Wednesday ..	Nil	30	Friday ...	Nil
15	Thursday ..	·9	31	Saturday ..	·03
16	Friday ..	·05	1	Sunday ...	·01

Total..1·27

Greatest amount of rainfall registered in 24 hours on the 15th Aug. ·9 inches.

Recorded by C. Drieberg.

PRACTICAL HINTS TO HORSE-OWNERS.

Chapter III.—Shoeing (*Continued*).

The portion of the hoof that touches the ground is called the soler surface, and is of very great practical interest to the horse-owner. The rim of the hoof ¼ in. or so wide that extends from one heel to the other and above up to the coronet is the wall. The heel is that portion of the wall where the latter meets the bar. The angle of the heel is formed by the heel and bars. The quarter of the wall extends from the heel to the shoulder of the wall, which is the point where the quarter and toe of the wall meet. The toe or tip is that semilunar portion situated anteriorly to the hoof. The white line on "linea alba" separates the wall from the sole. This line is the guide to the farrier

when driving nails, and when he gets inside of this he pricks the horse's foot. The sole protects the internal sensitive part of the foot from injury below and is surrounded by the bars of the wall. The bars are inflex portions of the wall which run inward from the heel and from which the frog emerges. The foot pad or what is vulgarly known as the frog, is a soft elastic lining of horney substance which occupies the space between the two bars. The parts of the frog are the toe on the point, body, heel and cleft.

I shall now briefly touch upon the function of the different parts of the horse's foot. The anatomy and physiology of the hoof of the horse are of the first importance to the Verterinary student. That part of the limb of the horse to which in ordinary language the name foot is applied is nothing but the extremity of the fingers or toes regarded from a zoological point of view, and extends from the carpel and tarsal (knee or hock) to the extremity of the limb.

The wall protects the inner structure from violence and atmospheric influences. The bars bear a certain amount of concussion and prevent the contraction of the hoof. It is the cutting away of these bars by the farrier that causes hoof contraction. The frog is the elastic cushion which prevents jar and concussion, and the cutting away of it also results in contraction. The coronary band is a soft elastic structure which unites the wall of the hoof with the main structure, and the duty of which is to prevent concussion.

A. CHINNIAH,
Veterinary Surgeon.

THE PLANTAIN.

Musa Sapientum is supposed to be what was intended by the Grapes, one bunch of which was borne upon a pole between two men, that the spies of Moses brought out of the Promised Land. It is no other than our Plantain or Banana. It prefers a rich fat soil, but it is agreed that we could and do grow it, though to a degree, in any soil; and who of us will deny it is one of the most interesting objects of cultivation for the subsistence of man? It is often the sole support of a family. Three dozen fruits will maintain a person instead of his rice and curry, or, whatever it may be, for a week. Whether used in a raw or dressed form it may be regarded rather as a necessary article of food than as a luxury. "To point out all the kinds" says a writer, "cultivated in East India alone would be as difficult to describe as the varieties of apples and pears in Europe, for the names vary according to the form, size, taste and colour of the fruit." Sixteen principal kinds are described at length by Rumphius from which all the others seem to have diverged. Of these the worst are Pisang Swangi, P. Tando and P. Gabba Gabba; and the best are the round, soft, yellowish sorts called P. Madji and P. Radja. Some cultivators at Batavia boast of having 80 sorts. Rheed distinguishes fourteen varieties by name as natives of Malabar. In Sumatra alone twenty varieties are cultivated, among which the P. Amas or small yellow plantain is esteemed the most delicate, and next to it P. Radja, P. Dingen and P. Kalle.

Sometimes they are baked in their skins, and then they taste like the best pears of Europe. The best sorts are served up raw at the table as in the East Indies, and have been compared for flavour to an excellent reinette apple after its sweetness has been condensed by keeping through the winter. They are also the principal ingredient in a variety of dishes, particularly in one called mantegue, which is made in slices of them fried in butter and powdered over with fine sugar. Of the many cultivated sorts, that called by the French La Banana musque, is considered the best; it is smaller than the others, but has a more delicate flavour.

Coming nearer home we have our (1) Rat kehel (red), (2) Suwandel, (3) Púwálu or Kólikuttu (sweet), (4) Aňamálu (elephant), (5) Horanawálu (sour), all used in their raw state; while (6) Alukehel (ash), (7) Kitala (green), (8) Soramundan (giant), (9) Newukehel (imported), and (10) Etakehel (wild) are made into dishes.

It is hardly known that No. 9, besides the fruit, affords a delicate vegetable in the young shoots. A peculiarity in No. 10 is that the unopened blossom is only edible. It grows wild and so nice to the palate and nutritious that it is seldom left out in the notices calling for tenders for victualling our jails and hospitals! The fruit has too many seeds and no flesh. Hence its name. I can state by experience that plantains can by cultivation be made to acquire exquisite flavours.

The Plantain takes 8 to 12 months to yield. About 100 bushes gave me a return of Rs. 20 to Rs. 25 per mensem for 5 years, and with no more attention than keeping cattle off.

Here is an opening for safe enterprize.

GEO. WEERAKOON,
Mudaliyar, Wellaboda Pattu, Matara.

FIRST STEPS IN AGRICULTURE.

First Stage—4th Lesson.

BY A. J. B.

You must not run away with the idea that everything a farmer sows in the ground will be sure to grow nicely and yield him a good crop. There are a great many enemies which the plant has to fight against, and it must conquer them all, because, once these enemies have beaten the plant, the poor thing can never rise up or gain strength to fight again. At every attack it gets weaker and weaker, and at last, if no help comes, it must droop and die. You know that a small band of soldiers has often been surrounded by such a large number of the enemy that there seemed to be danger of their all being killed. Then a strong body of their friends has appeared, and together they have attacked and beaten off the enemy, and the first little band was saved. Now, just suppose the plant to be in the place of the little band of soldiers. The enemy comes along in the shape of caterpillars and other insects, and they begin eating up the leaves or fruit or

blossoms, and some stick to the stem, others to the roots, others again to the leaves and fruit, and as fast as the poor plant is drawing in its food by the roots and leaves, the enemies are sucking it out through the stems, branches, and leaves. Then the farmer comes along to help it and kill and drive off these enemies, and he does all sorts of things, which you will understand by-and-by, to destroy them, and all the time he keeps giving the sick plants medicine, just as you get medicine when you are sick, till at last he has beaten off the enemy, and the plants are once more vigorous and strong, and yield their fruit at the proper season. You will learn all about these enemies, and their names, and how they kill the plant, and how the farmers got rid of them later on. Meanwhile, there are other enemies these unhappy plants nave got. Why, if you knew all that seeds and plants and crops have to fight against, you would wonder how any green thing could possibly live to ripen its fruit. Frost is a great enemy of some plants, but it is also an enemy to insects, and kills millions of them. When a frost comes on one very early in the season, or, worse still, very late, the farmers sometimes lose their crops or a great part of them. There were two or three hard frosts in the South of Queensland in 1899 which came when all the wheat fields were looking beautiful and promised to yield a very large crop. The wheat was just in the ear, when the grain is soft and milky. Then these terrible frosts froze the ears of the wheat, and killed them, and many farmers did not get a sheaf of wheat to thresh. They cut it all down and made it into hay, and built it up in big stacks waiting for someone to come and buy it. That was what an "unseasonable" frost did.

Then there are floods. Most Queensland boys and girls know what harm floods do. Some of the best and richest lands on the east side of the Main Range are situated along the banks of rivers and creeks. After heavy rains lasting for a long time, the land cannot soak up any more water, and it pours into the creeks. These run to the rivers, which cannot carry away the water as quickly as the creeks pour it in, so it spreads over the low-lying land, and farmers have often had so much water on their farms that they have been obliged to leave their houses in boats and camp on high ground until the water had run off, and then they had nothing left of all their crops and had to begin again.

If too much water is a bad thing, too little is much worse. As you already know, plants cannot live without water, neither can animals. So when many weeks or even months or years have passed without any heavy rain, the grass and water disappear, dried up under the hot rays of the sun. Where there is no grass sheep and cattle cannot live. Where there is no rain the crops will not grow on a farm. And so all animals and plants suffer, and thousands of animals die as soon as the plants have died. Thus you see a "drought," as it is called—that is, a long period without rain—is far worse for everybody than a flood. A flood does not remain on the land more than two or three days, and there is always plenty of grass everywhere in rainy weather. So perhaps a few cattle and sheep are drowned and all the crops are lost, but the farmer soon set to work and puts in a new crop. And this is one of the great advantages which you possess of living in Queensland. You can grow some crop all the year round. Supposing that big floods were to carry away all your corn crop in February, that is, the ripe corn that you were just going to pull and carry to the barn. In some countries you would have to wait a whole season before you could sow anything again. You would have to wait till all the snow and ice had gone before you could plough your land; and all the wheat, which, in cold countries like England, Germany, and North America, is sown just before the snow falls, so that the snow may cover it up and keep it snug and warm till the warm springtime, having been swept away by the flood, you would have lost the wheat season and could plant nothing for at least four months.

There in Queensland, if a crop is destroyed, you at once put in another either of the same kind or something else. If you have lost all your crops in February, you can begin to plant potatoes in March, and then you can next month plant acres of onions and cabbages and other things. So that a flood is not nearly so bad as a drought.

Very often a careless farmer gets a bad crop because of his carelessness. Let us consider the question of seeds. A poor shrivelled seed, even if it has strength to grow, cannot produce a fine vigorous plant, and anyone who sows bad seeds is a bad farmer, and ought not to be pitied by anybody because his crops are pure. Ded you ever see a farmer sorting out maize for seed? What did he do?

Either he spread the corn on the table and picked out all the largest and best-shaped flat grains, or he took the best-looking cobs and broke off the tops and bottoms of them where you often see single, round, small grains.

Then he threshed the grain off the rest, and so obtained the largest seeds. That is what a careful farmer would do.

But I have seen a farmer take corn for sowing out of a full sack without caring whether it was round, or flat, or broken, or withered. Such a man could not expect a good crop, and he would never make a successful farmer because, remember this, "If a thing is worth doing at all it is worth doing well." And when a man or a boy or a girl does one thing badly owing to laziness or carelessness they will in all probability be as lazy and careless about all the rest of the work, and so such people had better go and crop firewood if any one will keep their axes sharp for them, because they will never make farmers. Why, you may not think so now, but farming requires more head-work, and more careful work, and more reasoning things out than driving a locomotive engine. And farmers should learn all they can by reading plenty of books on agriculture, and they should get all the best machinery and buy the best implements and the best horses, cattle, pigs, and sheep if they mean to succeed in their business. It used to be the fashion to look down upon farmers as ignorant men, but now-a-days the farmers are looked upon as the most intelligent of men, and the greatest

men not only farm themselves, but they hold the farmers in the highest respect.

Our late beloved Queen Victoria was a most successful farmer, and so also is King Edward the Seventh. Thus no boy or girl need be ashamed to say my father is a farme,r because being a farmer means to belong to a profession which requires as much learning as age, and a great deal more than to be a soldier or a school-master or a clergyman. Well, I have gone a little off the subject, but still you have quite enough to remember in this lesson, so I shall now give you the usual questions to answer.

Questions on Lesson 4.

1. Why may the farmer not obtain a good crop from everything that he sows or plant ?
2. What have plants to fight against ?
3. How do they overcome their enemies ?
4. State some of the enemies the farmer has to overcome ?
5. What name is given to a time of long continued weather ?
6. Which state of weather causes most loss to a farmer—long dry seasons or very wet ones ?
7. State your reasons for thinking so ?
8. Why is a Queensland farmer more fortunate to the seasons than, say, a German or Scotch farmer ?
9. What happens if a farmer is careless in selecting seed ?
10. How would you select maize seed ?
11. Why should you be proud to be called a farmer's son or a daughter ?—*Queensland Agricultural Journal.*

INTERNAL PARASITES OF POULTRY.

The internal parasites ot poultry are numerous, but only two serious diseases are caused by such agents. The chief internal parasites are worms, but an often fatal complaint in fowls is due any how in part to minute single-celled animals known as Protozoa. The most important vermiceous disease is gapes. Gapes is a disease caused by a nematode or round worm which take up its abode in the bronchial tubes. It is called scientifically *Syngamus trachealis*. The gape-worm is also known as the Red-worm and Forked-worm. Not only fowls and turkeys, but pheasants, sparrows, linnets, starlings, rooks, partridges, martins, swifts, and wood-peckers are also invaded by this parasite. The disease is caused by the worms taking up their abode in the air-passages and there irritating the mucous membrane, causing inflammation. These pests, if present in large numbers, also block up the trachea and stop the passage of air to the lungs. In both ways the birds may succumb. The gape-worm is nearly always found in copula inside the host, the small male-worm being perm a nently attached to the female towards her head end, the two worms making a fork, hence its name the Forked-worm. In colour the gape-worm is red, often bright red; in length the female may reach four-fifths of an inch, the male seldom more than one-fifth. There is great variation in size, some females being only one-fourth of an inch long. As a rule, a number of worms may be found together in a fowl's trachea, often as many as twenty crowding in particular parts of the tube.

The symptoms of *gapes* are a curious listless gaping of the mouth, a whizzing cough, a stretching forward cf the neck and the frequent appearance of frothy saliva in the mouth and sometimes in the nostrils. When the female worm becomes mature and full of eggs, she and the attached male are expectorated by the bird. These worms lie about the ground, and sooner or later burst by cadaeric decay, when the minute eggs not 1-25th of an inch in length are spread over the grouud or in the water. Each worm contains a great number of eggs. It will be thus seen that land may soon be contaminated by a few birds suffering from the disease.

The eggs hatch in damp places and in water into small white embryos. Both eggs and embryos on entering a chick develop direct into the gapeworm.

Experiments have shown that birds fed with ova and embryos of *S. trachealis* will develop gapes, and thus no second host, such as we find in the tapeworms, is necessary. Although a second host is not necessary, numbers of the eggs and embryos are swallowed by earthworms, and doubtless fowls very often contract gapes when eating these useful annelida, which thus act as carriers.

It is chiefly in chicks and turkey poults that gapes causes the greatest mortality, although old birds are sometimes attacked. The birds obtain the embryos especially from polluted water and from damp ground, but also through the agency of earthworms. That wild birds play some part in its dissemination is also extremely probable,

Prevention and Remedies.

Any bird showing signs of the disease should be isolated. Chicks should not be kept with the stock birds. Fresh breeding ground should be used if possible every year. The worst outbreaks are always on overstocked land. Water vessels should be kept scrupulously clean, and only pure water given to the birds. The drinking troughs are best cleansed by being put in boiling water and well scalded. The worms may be partly removed from the trachea by means of a feather dipped in oil of cloves or eucalyptus oil pushed down the windpipe and turned round and round, but not those lower down the bronchi. A fumigating box, in which several birds can be placed at once, is useful; either Camlin powder or finely-ground chalk and camphor blown into the box will loosen the worms, which the birds expectorate during the violent fits of coughing the powder produces.

It is most essential that all chicks which die from gapes should be burnt or otherwise destroyed. If the birds are kept in small runs, the run should be purified, after an outbreak, either with gas-lime or watered with a 1-per cent. solution of sulphuric acid.

White Intestinal Worms.

Although death is not frequent from intestinal worms, of which both round worms (Nematodes) and flat worms (Cestodes) are present, yet debility is very often caused by two species of Nematodes —the White Intestinal Worms (*Heterakis papillosa*

and *inflexa*). These small white or creamy-coloured worms are chiefly found in the duodenum, and generally in groups of from ten to fifteen. Sometimes they form a plug which blocks up the alimentary canal. Birds infected with them are usually ravenous and yet keep losing condition. In length these white worms vary from one-third to the three-fifths of an inch in the case of *H. papillosa* and from 1 to 4 inches in *H. inflexa*. The eggs or embryos are probably obtained from dirty water but also off the ground. Diseased birds should be isolated. The worm can easily be expelled by a does of thymol; one grain made up in a dough pill and administered morning and night. Similar good results have sometimes been obtained by the use of three grains of santonine given in the same way.

Diphtheritic Roup is one of the most contagious diseases from which fowls suffer. It is due at least in part to certain very lowly organised single-celled animals called Protozoa which invade the mucous membrane of the mouth, pharynx, and even the drop and windpipe. This virulent disease manifests itself either as loose yellow cheesy patches or as small firmly-fixed nodules in the mouth, the latter especially around the tongue and beak. In these false membranes and the tissues beneath them may be found the minute parasites which either directly or indirectly cause the false growths. Certain authorities state that bacteria are the active agents, but the probability is that these Protozoa are entirely accountable for the disease. If left alone a diseased bird is almost sure to die.

It is most important that any bird showing any symptoms of this complaint should at once be isolated, and the drinking vessels in the run well disinfected by boiling and strong carbolic acid.

The loose growths should be very carefully removed with a blunt knife or two blunt needles, and the mouth well washed out with a 10 per cent. solution of salicylate of soda or boracic acid. Probably several operations will be necessary, as some small diseased areas may escape notice. In any case the mouth is best treated several times with the disinfectant. The hard patches may be burnt away with lunar caustic. Every dead bird should be carefully destroyed and the run or yard disinfected either by sulphuric acid or by a dressing of fresh gas-lime after an outbreak. The best results in treatment have been obtained with salycilic acid or salicylate soda, and it is advisable to place a one per cent. solution for the fowls to drink for a week after any signs of the disease have been noticed in the run. In no case should a bird be allowed freedom until it has been completely cured. When the disease is very advanced it is best to kill the bird and destroy it, but if taken in time a cure can be easily affected. Another disease closely related in origin to this form of Roup and often found with it is a comb and wattle disease called *Epithelioma contagiosum*. It appears as yellowish brown nodules varying in size form a pin's head to that of a bean. A hollow from which a yellow exudate oozes and forms a brownish crust or scrab appears in the nodules. The parasites are minute protozoa which invade the epithelial cells. The best treatment seems to be painting the diseased areas with oil of turpentine and isolating the bird.

To avoid all parasitic diseases of poultry it is very important that fresh stock birds should be well examined before being turn out, as a single diseased bird, especially if it be a cock, may soon contaminate a whole run.—*N.S.W. Agricultural Gazette.*

THE FIG.

In view of the fact that a number of people are trying to grow figs and grapes, we insert the following notes—with reference to the fig industry near Smyrna, one of the chief fig-growing districts—which, we believe, will prove of interest to local growers of the fruit. The notes are extracted from a report by Mr. W. Finacure after a visit to the country :—

The soil in the Meander Valley, where the fig of commerce grows, is, owing to its position, very loose, and very deep, and has the advantage of retaining moisture. Many opinions have been advanced to me why this valley is so adapted for this peculiar kind of fig, one being that the tree requires moisture, and the character of the soil is such that it retains it. Another, that the valley is sheltered, which is the case; it is surrounded by mountains. Another, that the soil contains a certain amount of sweetness, as a proof of which is instanced the immense quantity of Liquorice it produces. It is impossible, to my mind, to arrive at any correct conclusion, because cultivation is carried on so recklessly and stupidly that it is difficult to say what are the precise advantages from which the tree profits.

The cultivation as conducted by the natives is bad. The soil is badly tilled, the trees badly grown, they are untrained, and the suckers which grow off the parent tree, under the delusion that they add to the producing power, are fastened on to the tree. No doubt this gives a greater bulk, but it is not agriculture. Rules as to drainage are utterly disregarded; the fig may require much moisture, but a certain amount of drainage is also necessary. I have seen a whole plantation flooded with rain water for want of escape, simply because the natives are too lazy to form the ground properly. All Englishmen to whom I have spoken agree with me that the impressions which I formed as to the slovenliness of the peasants are quite correct, and I am certain that as a consequence of bad cultivation the fig has deteriorated. The skin is leathery, and the flavour poor. The fact is, Nature has done so much in Asia Minor that man is not inclined to exert himself.

Fertilisation takes place when the fruit is one-third the size; it will attain when ripe and to prevent the fruit dropping prematurely, and to hasten its ripening, caprification is resorted to. It consists of placing the wild fig among the branches of the domestic one. Wreaths are made by stringing loosely on pieces of rushes from two to twelve wild figs, according to the size of the tree upon which it is to be placed. The peasant takes a basketful of these wreaths and flings

them into the branches where they remain. The insect which infects the wild tree leaves it and enters the domestic fruit by the orifice. This is the process which is called caprification, and it is undoubtedly this action which prevents the domestic fig from dropping before maturity and makes it grow large. There are, of course, many proofs in support of this theory, but the most recent and authentic one which I have heard is from the lips of Sir Edwin Egerton, the British Minister at Athens, a gentleman who takes a considerable amount of interest in matters of this kind. Sir Edwin told me that there is a fig tree in the Embassy garden, the fruit from which always dropped prematurely. He procured a wild tree and planted it in the garden, and when it bore fruit he followed the caprification practice. Since then the fruit remains on the tree, not only until quite mature but actually until half dry.

The rainfall at Aidin* for the twelve months from July, 1895, to June, 1896, was 21·71, and from July, 1896, to June, 1897, was 26·45. In ordinary regime July and August are rainless in all the country from Smyrna to Ortakchi. If there is rain, as I am imformed, there was this year, it is not seasonable for the fig, and if there is rain early in September it is damaging, inasmuch as it prevents the completion of the drying and interferes with the despatch of the fruit in its best condition.

The temperature in the shade runs freely to 90 degrees Fahr., any time in June to August, and with north-easterly winds to 95 degrees to 100 degrees occasionally. In winter it runs as low as 45 degrees to 50 degrees. I have not been able to obtain complete data as to the temperature, because no record is kept, but I am informed by the British Vice-Consul at Aidin that the above is a correct estimate.

I have been informed by the Director of the Railways that his lines have carried this year to port (Smyrna) over 30,000 tons of figs; this, of course, does not represent the whole production, which this year was below the average owing to unseasonable rains, for immense quantities are carried by the caravans, besides the enormous consumption in the country. Apart from the fig, which is the staple product of the country, corn, maize, barley, oats, millet, and all cereals are grown. All fruit, excepting tropical fruit, grow; the date palm is grown but does not bear fruit owing to too much cold in winter.

Enormous quantities of the liquorice root are dug out of the ground in the Aidin district. Messrs. McAndrews and Forbes, of London, have an establishment where they collect the root, pack it in bales, and export it chiefly to the United States, where the juice is used in the preparation of tobacco. I see no reason why the production of liquorice should not be made an industry in Queensland. All that it requires is, after digging up the roots, to cut them in suitable lengths, pack them in a kind of wool-press, and they are ready for export.

The importance of the colony entering into the fig cultivation cannot be over-estimated, when it is remembered that the cost of experimenting is not very great. Any farmer can grow a row of trees on the margin of his allotment in much the same way as that in Italy. Trees are grown along the border of land carrying cereals, adding very much to the effect of that beautiful country.

There are parts of the country in which I am sure the fig will succeed, and if once we are successful it will be a source of great wealth to the colony. The Smyrna fig is deteriorating, as I have already said, owing, I suppose, to cultivation; and if the colony obtains a footing in the markets of Europe, Asia Minor will have reason to regret its lethargy. The countries which mostly draw the best quality of figs, those called Elemes, are the United States and Germany.

* 81 miles from Smyrna and in the heart of the fig-growing district.

INFLUENCE OF FORESTS ON THE CLIMATIC CONDITIONS OF A COUNTRY.

Though it has been admitted in the first part of this introduction that the climate of each country and of each district is *prima facie* dependent upon its geographical position, its elevation, the configuration of the ground, and other cosmic causes which are independent of local circumstances it can hardly be denied that the existence or non-existence of large well-wooded areas in a country naturally capable of growing forests affects its climate in a very marked degree. History proves this to us in numerous instances where the deterioration of the climate of whole districts, and even of whole countries, has followed the destruction.

The once well-wooded Dalmatia is a stony desert; Persia once one of the granaries of the East is barren and desolate over a large extent of the country. North Africa, formerly one of the main corn markets of Rome, is subject to the severest droughts. Spain, Italy, Sicily, Greece and Asia Minor have suffered greatly from disforestation, and finally, but not least, India especially in the intermediate and dry zones in the Deccan, and in the north-west of the country has been injured by the destruction of her forests.

Even Oskar Peschel, who questions the importance of the influence of forest growth on the climate of a whole country perhaps more than any other writer of note, throws no doubt on the observations made by Boussingault, Hamboldt, and Bompland, and acknowledges the local influence of forests on the precipitation of moisture. He says, however, and he has numerous followers even within the ranks of the Forest Department, that the amount of rain which falls year by year on the Continent would be exactly the same if there were no forests at all.

"The amount of rain," he states, "depends on the extent of oceans and seas, on the degree of heat, and on the rapidity with which the air moves over the surface of the waters. None of these conditions are changed," he writes, "by the extent or absence of forests. All air currents blowing from the sea are year by year charged with the same amount of moisture, which precipitates as soon as the air is cooled below the point of saturation. If such precipitation be caused by forests, the air currents reach the

regions behind these forests drier and unable to yiel d a further supply of water."

It is thus Oskar Peschel teaches in his well-known work "Neue Probleme der vergleichen den Erdkunde," but he entirely omits from his calculation re-evaporation of moisture precipitated on the land, and his conclusions cannot consequently be accepted. A well-wooded forest area may best be compared to a landlord who spends his income derived from the country within it and for the benefit of his neighbours where as cleared areas resemble absentee proprietors who scatter their revenues in foreign parts. It rains; the drops are scattered on the leaves and fall in a soft gentle spray or in slow falling big drops, which have collected on the foliage on to the spongy forest ground. The water has thus time to percolate slowly into the soil below, whence a large quantity is gradually pumped up again through the roots of the forest trees exhaled by their leaves and again assists in forming rain clouds. Wooded areas, no doubt, extract under the same circumstances more moisture out of the air than for disforested regions, but they serve as a store-house and yield again what they take, whereas a great portion of the water precipitated on barren soil is only recovered by evaporation from rivers, lakes, and oceans. Forests use, therefore, much less moisture than barren areas in the same position and under similar conditions and augment the atmospheric moisture in regard to regions which are separated by such forests from the sea instead of diminishing it. Their action in this respect is not the same time as that of an intervening mountain range.

In Assam, which is a-broad, isolated, well-wooded valley, rain clouds form in the winter and it rains when no air currents reach it from the sea. The clouds are home-born and are to some extent, at least, due to re-evaporation from the vast forest areas still in existence. The same laws naturally apply to any locality, though they may not be so strikingly exemplified. It may be argued that evaporation from open ground is much more intense than from soil covered by forests. No doubt this is the case, and Ebermayer in his "die Physikalishen E'nwirkungen des Waldes auf Luft und Boden" gives the following data:—"The forest alone, without the cover or dead leaves diminishes the evaporations by 62 per cent. as compared with that in the open. Evaporation is consequently 2·6 times less in the forests. A covering of dead leaves and vegetable mould diminishes evaporation by a further 22 per cent. Forests with an undisturbed covering of dead leaves and vegetable mould lessen the evaporation as compared with that in the open by 84 per cent.

These data are based on observations made in Bavaria during the summer months. In the Indian climate the difference, which increases in proportion to the heat and dryness of the atmosphere would be even more considerable.

The above data refer to the evaporation from the soil, which, of course, can only take place as long as there is water on the surface which in the open is not the case for long, as it either flows off or gravitates out of reach of the influence of evaporation. In a forest the water does not flow off with the same rapidity, and much of that which gravitates into the soil is pumped back by the long roots of the forest trees, and especially during the period of vegetation is exhaled by the leaves in quantities which represent far more than the moisture evaporated from the open ground. There can be no doubt, whatever may be said to the contrary, that the widely-spread notion that forests tend to increase the rainfall, and that in a warm country, diminishes its moisture, and consequently its fertility is correct. As already pointed out the theory is proved by history and ruins. and the rapidity with which changes in the climate of different countries have taken place entirely forbids that such sudden modifications should be ascribed to cosmic causes. We accept other scientific problems on such more flimsy evidence, but in this instance a large number of us suddenly swerve aside and follow a school which starts new theories on partial observations and leaves re-evaporation out of consideration. Ebermayer fonnd from experiments made that during July, the hottest month in Bavaria, only 6 per cent which filtered down to the depth in a forest, the ground of which was covered with complete and undisturbed vegetable mould.

In the one case the water rapidly runs off into streams and seas by sudden floods and freshets, and this too when the whole atmosphere is surcharged with moisture. In the other instance the water is stored for re-evaporation through the foliage of the forests, and is given forth at the time when the air is drier and the winds do not blow from the sea. It may be safely stated that more than the rain which is thus stored in the ground is re-evaporated by the trees in time of need, and even at this low computation a well-stocked, a well-protected forest area, the vegetable mould of which is undisturbed by either fire or the axe or rake of the "rab" or "sir" collector would re-supply to the atmosphere at least one-third of the moisture which is precipitated on it. This would be available for the open country. If therefore 30 per cent of the country was under complete forest, the rainfall should increase by 10 per cent under conditions similar to those which exist in Bavaria in July.

In India, or any other country with such a fierce climate as ours, the influence should be more markd.

The monsoons in India, it is argued, must be quite independent of forest growth. Quite so. Forests can have no influence whatever on the amount of moisture drawn from the ocean, and the general direction of the winds is unquestionably governed by greater causes, but, apart from this, periodical rains are subject to the same general laws as all other rains, and must, therefore, be affected by the same causes, and amongst them by extensive forest growth, in exactly the same way and degree. The air may be charged with moisture which need not, however, be precipitated. If an extensive snowfall in the outer Himalayas can affect the monsoon rainfall, it seems certain that forests can do the same, though probably not to the same degree.

[*Forestry in British India* by B. Ribbentrop.]

(*To be concluded.*)